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The THERAPEUTIC GAZETTE

INCORPORATING

MEDICINE AND THE MEDICAL AGE

A Monthly Journal of Practical Therapeutics

Edited by

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Issued on the 15th of each month.

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ORIGINAL COMMUNICATIONS.

THE BLOOD-PRESSURE QUESTION FROM THE STANDPOINT OF THE GENERAL PRACTITIONER.

BY H. A. HARE, M.D.,

Professor of Therapeutics and Diagnosis in the Jefferson Medical College.

There are few subjects about which more has been written in the past fifteen years than this, and yet we are not yet arrived at the point at which it may be said that all its phases have been grasped. Without doubt, many conclusions were reached which have been found to be at least in part fallacious, and many ill-founded or erroneous statements as to prognosis and treatment, in individual cases, have been made. The difficulty has been that some physicians are too much inclined to rest a diagnosis upon one single factor, whereas in every patient a correct diagnosis never can be reached until all the facts have been put together and each given its proper relative value. This tendency is seen in all parts of medicine, as, for example, when a positive Wassermann report leads the physician to believe he has discovered the true cause of a train of symptoms, when in reality the dormant syphilis has nothing whatever to do with the present manifestations. The first point I would like to emphasize is, therefore, that the result of the blood-pressure examination should be taken only as a part of the picture, of no greater, if as great, importance than other parts.

Another point is that a moderately high pressure with a low specific gravity of the urine and many hyaline casts is far more important than a very high pressure with a urine which is practically free of casts.

A third point is that too much stress is placed upon one blood-pressure estimation, just as too much is placed on a single urine analysis; only by several estimations can an average, or standard, of the patient's pressure be obtained, for at the first estimation the psychic factor may cause a rise of pressure 15 or 20 points greater than the average.

A fourth point is that high estimations made in the office will often be found, even if taken frequently, to be far above what they are when the patient is seen at home in bed, or in a chair, and so an erroneous view of the pressure constantly present is obtained.

Again, if the pressure be taken and retaken in a few minutes at the same sitting the true or approximately constant pressure will be shown by the second estimation, the first being often 10 or 15 points higher than the last.

Sixth, the common practice of estimating the systolic pressure without the diastolic pressure is to be condemned because it is the least important of the two estimations, for the diastolic pressure tells us of the constant pressure by means of which the circulation is really maintained, tells us not only that it is too high, or too low, but what the demands on the heart amount to. A high diastolic pressure subjects the heart to hard work, but the fact is often overlooked that a pressure which is too low is much worse for the heart muscle, which soon exhausts itself in the attempt to raise pressure at a time when a low diastolic pressure is

causing an inadequate filling of the coronary and other arteries.

A pressure above normal may be present for years without trouble. A pressure below normal may cause disaster in a few hours.

When the diastolic pressure is subtracted from the systolic we get an idea of the actual cardiac power. No better illustration of this can be found than the great difference in systolic and diastolic pressure in aortic regurgitation, when the difference is often 100 points if the characteristic hypertrophy of the heart in this disease is present.

The estimation of the systolic and diastolic pressures also tells us how much reserve the heart muscle possesses if we use the stair-climbing or hopping tests.

Again, the diastolic pressure, if high, indicating rigid vessels, tells us that the heart burden is not only increased because the heart must pump harder to drive the blood through rigid tubes, but also because the normal elasticity of the vessels is a great aid in the propulsion of blood. An animal's heart attached to a set of rigid tubes tires out rapidly because of this fact. Ludwig and Brunton showed, years ago, that the elastic tissue and the muscular coats of healthy vessels are active agents in urging on the blood. Without doubt the failure to yield, on the one hand, and the lack of pulsation on the other, which helps the heart, is the chief reason why men in middle life with perfect hearts cannot run as in youth without dyspnea.

This brings me to a theme which I insisted upon some years back, namely, that as a man grows older a rising pressure both systolic and diastolic is necessary to his normal existence so far as the function of his vital organs is concerned. These organs cannot get enough blood if the so-called normal pressure of about 135-90 is present. He has established for himself what I have called a "pathological norm," a contradictory term which is nevertheless accurate.

Not infrequently one sees cases in which the physician, with good intent, succeeds in reducing pressure to the average level only to find that the patient is far more miserable than before treatment. It may be, in a given case, that the pressure is too high for the safety of the heart or of the vessels, but this does not mean that we should endeavor to force it to the theoretically normal level for a man of thirty years of age. In each case the physician must endeavor to reduce the systolic and diastolic pressure sufficiently to relieve stress and also endeavor to increase the difference between the systolic and diastolic pressures, if this be abnormally low, as for example only 15 to 20 points between systolic and diastolic, indicating actual cardiac weakness or fatigue. It is in these cases that electric cabinet baths, massage, and the alteratives do far better than the nitrites, as a rule, if the former agents are cautiously and skilfully employed.

There are two points in aortic regurgitation to which I wish to call renewed attention.

If the patient with an aortic regurgitation lies prone on the back, it will be found that there is always a wide difference between the blood-pressure in the brachial artery and the vessels of the leg. This difference in pressure may be as much as 100 points in cases in which the systolic pressure in the leg is characteristically high. Of course, there is a great difference in all persons between the pressure in the arm and leg, if they are sitting up or half-reclining. The patient must be prone, as I have stated, to make this sign of any value. Another interesting point in connection with the difference between the pressure in the arm and leg in aortic regurgitation is that the administration of a hypodermic of nitroglycerin will bring the pressure in the leg and arm to approximately the same point. In other words, the nitroglycerin by relaxing the vessels in the lower extremities reduces their high pressure more than it reduces the pressure in the arms. Furthermore, if a patient with aortic regurgitation does not receive nitroglycerin but has his lower extremities placed in a hot pack, the same reduction of excessive leg pressure occurs, so that the great difference between

the arm and leg pressure characteristic of this lesion no longer exists.

It is always unsatisfactory not to be able to give a physiological explanation of interesting phenomena of this character. One would suppose that if nature was endeavoring to compensate for leaking aortic valves there would be a fall in pressure rather than a rise, since by this means the stress on the aortic valves would be diminished and the degree of regurgitation decreased. Again, if it be thought that the high pressure in the legs is designed to prevent too much blood from going to these parts, so that the vital centers and the heart would be deprived of blood, one would suppose that when the patient was lying prone the systolic pressure in the arms and legs would be identical; or again, that the reduction of the high pressure in the legs by the use of nitroglycerin, or the hot pack, would induce a sense of dyspnea or faintness. I have tested these facts in regard to aortic regurgitation in a large number of cases, and I have never found a case of any other valvular lesion of the heart presenting these signs, which are far more constant than the capillary pulse and as constant as the Corrigan pulse.

NOTES ON DAKIN'S SOLUTION.

BY K. P. A. TAYLOR, M.D., PHILADELPHIA.

Because of the relative ease and cheapness of its preparation, Dakin's solution remains the most favored of the antiseptics used in war wounds, and will probably continue so. Dichloramine is as yet almost unheard of in France. While serving in an American hospital in France last summer I was able, with Mr. Thorington, to make a few observations on Dakin's solution which you may find applicable to your future service.

Dakin's solution is sodium hypochlorite with an excess of sodium hydroxide, and in its manufacture neutralized with boric acid. By a later method of preparation outlined by Dufresne, the excessive alkalinity, and therefore the use of boric acid, is avoided. Dakin's solution must be used in strength varying only between the limits of .45 and .50 per cent. Below these figures a large part of its antiseptic power is lost, while above them it becomes too irritant.

The determination of the strength of the solution used and the maintenance of a supply of Dakin's of the proper strength are of the utmost importance for this reason. The solution is readily made up by the pharmacist of the hospital and sent to the pathological laboratory in large wicker-covered demijohns for the titration of its strength. If the solution fails to fall between the marks .45 and .50 per cent it is rejected as unfit for use.

In the wards Dakin's solution is commonly placed in one-liter glass ampoules, which are suspended above the bed and connected with the interior of the wound by means of a flexible rubber tube. A pinch-cock on the tube regulates the flow of the fluid. Every two hours the nurse opens the pinch-cock for a few seconds to allow fresh fluid to enter the wound.

An interesting feature of Dakin's solution is the rapidity with which it loses its strength when exposed to the light. It is constantly tending toward an end reaction which has the breaking down of sodium hypochlorite and the production of chloric acid as its features. This equilibrium is speedily upset in light, whether direct or indirect.

A one-liter ampoule of Dakin's was kept in the laboratory under as nearly as possible the same conditions of lighting as that obtained in the wards. Each day at the same hour the solution was titrated for strength. The fall in strength per day is almost barometric in its indication of the degree of sunlight to which the solution has been exposed. A fall from .49 to .42 per cent is typical for a moderately sunny day. A solution kept in this fashion dropped from .49 to .04 per

cent in twelve days. It is seen that after even a single day of exposure the solution falls below the minimum effective strength, *i.e.*, .45 per cent. On overcast or very cloudy days the fall on the other hand may be as low as one- or two-hundredths per cent.

Now the findings have a very important bearing on the use of the antiseptic. In most hospitals the solution is kept in clear glass ampoules as indicated above and the nurses vaguely instructed to "refill the ampoules every day or so." It would be necessary really to empty each ampoule daily in sunny weather and fill it again if the proper strength Dakin's was to be maintained. As a matter of fact, what really happens (as determined by investigating the actions of the nurses in half a dozen wards and incidentally incurring a great deal of unpopularity) is that the nurse refills the ampoule daily without first emptying it. In a series of about 20 cases the average 24-hour use of Dakin's solution per case was somewhat less than 250 Cc. This was determined by marking the daily fall on the ampoule. This then is what happens to the Dakin's: of 1000 Cc. in the ampoule 250 Cc. are used; at the end of a moderately sunny day there are remaining 750 Cc. which have declined in strength from .49 to let us say .42. The nurse's aid then refills the ampoule with full-strength Dakin's—adding 250 Cc. of Dakin's at .49 per cent to 750 Cc. of Dakin's at .42 per cent, with the result mathematically demonstrable as 1000 Cc. of Dakin's at only .435 per cent. Thus even after the first day the Dakin's is practically valueless as an antiseptic, and with the process of refilling repeated daily and cheerfully by the nurse's aid the Dakin's can easily reach the end effectiveness of tap-water. All of this difficulty can be overcome by keeping the Dakin's in dark glass ampoules, by covering the clear glass ampoules with a dark-blue muslin, or by using a little $KMNO_4$ 1:20,000 in the solution.

The practice at present is to run the Dakin's into the wound through a rubber tube. A tube of the caliber and length used was selected and filled with Dakin's solution, both ends of the tube being clamped. After 24 hours the Dakin's was removed from the tube and titrated for strength. This process was repeated for 15 days, using fresh strong Dakin's daily. It was found that Dakin's so exposed to soft rubber lost an average of 9 points in strength in twenty-four hours—*i.e.*, Dakin's of .49 per cent would emerge Dakin's of .40 per cent. The rubber was extensively eroded, showing that a chemical reaction of some sort accounted for the fall in strength of the solution. This rubber tube was broken when a weight of 7 K. was hung on it, while a similar new tube failed to break with a weight of 9 K.

The tube held about 10 Cc., and this was the amount used for each injection of the wound through the tube. By dividing the total 24-hour fall in strength by 12, the fall for a two-hour period was found to be almost one point, showing that Dakin's when it reached the wound was one point lower in strength than when it left the ampoule. This means that Dakin's of the minimum strength of .45 per cent when placed in the ampoule is unsuitable by the time it reaches the wound since it is then no more than .44 per cent if a rubber tube is used for its conduction.

To overcome this difficulty the ampoule and rubber tube are best substituted by a dark glass bottle in which the Dakin's is kept, and a small graduated syringe. A short rubber tube reaching from the depths of the wound only to the surface of the dressings should be used, and the Dakin's squirted in this tube by means of the syringe every two hours as prescribed. In this way the Dakin's does not stand in the tube and undergo decomposition. Another valuable feature of this method is that it permits a measurement of the amount of Dakin's used. With the tube and pinch-cock system every wound, whether large or small, received about the same amount of Dakin's. The large wounds are thereby not sufficiently irrigated and the small ones slop over, exposing the sensitive surrounding skin to the irritant solution. By means of a syringe the exact amount of Dakin's required to fill the wound can be measured

by the surgeon, this dosage prescribed by the surgeon, and adhered to by the nurse.

BURNS.

Many severe burns result from incorrect use of Dakin's. I have seen Dakin's seeping along the conducting tube, which was faultily placed next to the skin and in a dependent position, eat through into the muscles of the thigh. These accidents can be prevented by having the Dakin tube so placed that the solution enters by gravitation from above, and avoiding a dependent position of the tube, whereby Dakin's, forced upward in the tube, tends to seep back along its outside. The skin for a distance of 2 to 3 inches around the wound must be further protected by strips of gauze or flannel soaked in vaselin, and an abundant wad of gauze must be placed directly above the wound and not overlapping the vaselin zone. The purpose of the latter is to absorb the Dakin's from the wound and make it possible to use second-hour irrigation without soaking all the dressings.

An attempt was made to determine what component of Dakin's caused the burns, whether the excess alkalinity, the sodium hypochlorite itself, or the acid resulting from its decomposition.

It was found that as ordinarily prepared Dakin's solution is neutral or acid in reaction to powdered phenolphthalein. It required 2.4 Cc. of N/5 NeOH sol. to produce a decided pink color in 10 Cc. of freshly prepared standard Dakin's. This gives it an acidity of N/20 (a relative figure only). To litmus paper, on the other hand, the same solution is alkaline to the extent of N/22 (relative figure also). As the solution decomposes and loses strength its alkalinity decreases with the production of the end product, chloric acid, and eventually becomes acid in reaction even to litmus. The excess alkalinity of Dakin's titrated with phenolphthalein is a small factor in causing burns. If litmus paper is used, this alkalinity may be eliminated by using an excess of boric acid, and I should recommend its substitution for phenolphthalein. A French writer, Dufresne, has attributed Dakin's burns to boric acid, but this may be disproved by keeping a supersaturated solution of boric acid on the soft skin covering the inside of the forearm. It does not cause even a hyperemia.

The major factor in causing the Dakin's burns, however, is the sodium hypochlorite itself. A solution of .70 per cent with the excess alkalinity entirely removed was placed on one forearm, and a normal solution on the other. The stronger solution was unendurable after a half-hour, while the normal solution burned far less. A Dakin's solution of .34 per cent burned even less than the normal, so that the strength of the hypochlorite is an index of its burning ability. This indicates the importance of careful titration of Dakin's for its strength. The excess alkalinity should also be eliminated as a factor by using litmus paper as the indicator.

ACTION ON BLOOD.

Frequent and alarming secondary hemorrhage following the use of Dakin's after an operation has led many surgeons to abandon its use. Dakin's solution promotes hemorrhage by three actions: it tends to break down fresh granulations, it dissolves clots, and it prevents blood from clotting. With Wright's salt solution and dichloramine-T assuming such importance as wound irrigants, it is interesting to determine how Dakin's solution, salt solution, and dichloramine-T differ in their action in this respect.

A series of capillary glass tubes of the same size was made. The blood of a dozen people was collected in these tubes and the average clotting time determined by breaking the tubes at quarter-minute intervals. The average clotting time for tubes of this size at room temperature was about three minutes.

One part salt with 3 parts blood clotted in 3 minutes.

One part dichloramine-T and 5% sod. citrate clotted in 1 hour.

One part 5% salt and 5% sod. citrate in 20 hours.

One part 5% salt and .5% sod. citrate in 20 hours.

Blood and Dakin's solution were mixed in the proportion of 1 part Dakin's to 3 parts blood, and no clot was got after several days, the mixture drying up.

It is seen that Dakin's inhibits clotting most, with the hypertonic saline, dichloramine-T, and normal saline following in order of inhibitory action.

Capillary blood clots of the same size were exposed to the action of these solutions. A clot was completely dissolved in five hours by Dakin's, in fifteen hours by the hypertonic saline solution, and not appreciably dissolved by the normal saline and the dichloramine-T.

The last two preparations are thus seen to be superior from the respect of their action on blood. Dakin's solution, it will be seen, is an extremely dangerous agent wherever there is a possibility of thrombosis destruction, or in the face of capillary or venous hemorrhage.

Dakin's solution has also the property of dissolving gut sutures and ligatures. I have tied a large gut ligature around a piece of rubber tubing, placed it in a tube of Dakin's, and on the next day found no trace of it.

Dakin's therefore should never be used directly following injury or operation, nor for several days thereafter.

Saving Dakin's.—This is an important problem, since it is not an easy matter to make Dakin's solution of the proper strength, and failure to do so in many hospitals results in loss of material and time.

It was found that Dakin's below strength can be raised several points by the addition of salt 1 teaspoonful to the pint. This reverses the end reaction. Dakin's when considerably below strength can be raised by slow steaming. A loss of one-fifth in volume will be represented by an approximate increase by one-fifth in strength, but a solution corrected in this way loses strength rather faster than a fresh solution and should be used at once.

Dakin's solution if too strong can simply be exposed to sunlight, but it was found that it can be more rapidly reduced by quick boiling.

ECLAMPSIA GRAVIDARUM ET PARTURIENTIUM.

BY J. K. BRAMMER, M.D., CINCINNATI, OHIO.

Is there a disease or a condition of a patient, other than actual dissolution, that so fills the heart of the practitioner with alarm, and perturbation of soul, as that of the eclamptic seizure? Like a sudden explosion it fills his heart with terror and paralyzes him with grave apprehension.

Delivery may have been accomplished without complication, and just when he is congratulating himself and his patient, suddenly and without warning the storm breaks. Violent convulsive seizure grips his patient, and instantly panic reigns with those present. Violent contortions and writhing of the body are followed by relaxation and peaceful slumber seems to envelop the patient, and a sigh of relief escapes from the anxious friends.

The coma, however, to the eye of the practitioner presages the calm before the storm that may suddenly break with increased violence.

Puerperal eclampsia may be defined as an acute toxic disease, occurring during or after pregnancy, manifested by a convulsive seizure, loss of consciousness, and coma. It is associated with changes in other organs, depending on duration and number of convulsive attacks.

Williams has quoted 45,000 labors, tabulated by five observers, giving a frequency of one case of eclampsia in 175 labors. Other observers give from 1 in 125 to 1 in 400 cases.

We can say definitely only one thing, and that is that it is due to a toxin which affects the brain, kidneys, and motor mechanism. This toxin may be the result of kidney changes, the result of excretions from the fetus, or the result of changes in degree,

character, or amount of secretion from the ductless glands.

There is a wealth of literature on this point, and volumes have been written, but still the real cause of eclampsia has not been definitely determined.

Fischer looks on the condition as one of acidosis, and has given very good physiological reasons for his theory; not only does he give the reason, but his treatment, based on the acidosis theory, is the alkaline treatment that practically bears his name. Others have written on this theory, and Hagan of California has written largely concerning it, and has had some wonderful results with the alkaline elimination treatment.

Time of year and different years show great variations in numbers of cases in the same hospitals, leading to the belief that there might be some form of infection or contagion as an etiological factor. Position of the fetus has been said by some to be a causation. We find that primipara are most frequently attacked; the reason for this is a subject of much debate.

Zealifel has reported a case occurring in the third month of pregnancy, aad by many observers the severe vomiting of pregnancy is considered to be due to the same cause as eclampsia. The most that we can say is that it is a toxemia.

We find that the thyroid gland enlarges at puberty, and during pregnancy the failure of the thyroid secretion to supply both mother and child is probably one of the causes. The changes due to hypothyroidism or myxedema cause some analogous symptoms.

I am inclined to the belief that an insufficient ductless gland secretion is an etiological factor that cannot be disproven.

The pathology is all those changes which occur as a result of the reaction of the tissues and organs to the insult of the toxin. The kidney changes are by most authorities considered to be the result and not the cause of the disease. The nephritis is represented by the changes in the kidney substance, and is similar to other forms of nephritis, and is the inflammatory reaction due to toxemia. It can as well be explained by the acidosis theory as by any other way. Cloudy swelling occurs in the cells lining the tubules, and albumin is thrown off as a result of cell destruction. The coma comes on as a result of the high blood-pressure, and consequent edema of the brain.

Various cerebral changes take place. Edema, hyperemia, thrombosis, and apoplexy are some of the results described by some good authorities. It must, however, be borne in mind that all the findings as described have been found only in fatal cases where autopsy has been made. It is therefore highly probable that all the symptoms and findings of autopsies are not present in every case as seen by the general practitioner, for many patients recover.

Certain changes take place in the liver which are analogous to the kidney changes and are known as necrotic areas in the liver. These changes are due to cloudy swellings which go on to cell destruction, and hence the areas of necrosis form. These liver changes are so characteristic that some authors (French) claim they represent the primary lesion.

Albuminuria has been absent in many cases, and in consequence the kidney, as a primary factor, is questioned.

Edema of the lungs occurs early, and is very severe in fatal cases.

Symptoms, when noted carefully and early, are headache, dizziness, some edema of the hands and feet, ringing in the ears, with nausea, and vomiting may forewarn the doctor that trouble is approaching.

The urine is reduced in quantity, while the specific gravity may remain near normal, or may even be high. Reduction in urea output is always suspicious. Albumin is usually present in small quantities and may be so great as to solidify the contents of the tube when boiled.

Some changes in vision can usually be detected, and an examination of the fundus will show changes up to choked disk.

Gastrointestinal symptoms are usually present, and may be manifested by constipation or diarrhea, usually diarrhea, at least in the cases coming under my observation.

Anorexia, nausea and vomiting are sometimes present before the convulsion comes on, and headache is one prominent symptom. Convulsion may come on before, during, or after delivery of the child, and the patient may have anywhere from one to fifty convulsions before death closes the horrible spectacle. I have never witnessed a case where life was not sacrificed after the continued convulsive period reached the eighty mark. One notes before the convulsive period the following symptoms: incoherent murmuring, eyes staring and fixed, face flushed, pulse full and bounding—a convulsion is imminent. Always following the seizure the patient lies as if in deep slumber, and any effort to arouse her will be met with failure. Prognosis is always grave, and the mortality runs from six to twenty per cent in the mother, and higher for the child.

When a case can be seen early and gotten under control, much can be done to prevent the development of this very serious condition. General hygienic care has much to do with the prevention. Hot baths, plenty of fresh air, water, and restricted diet, rest in bed and quiet are full of value.

Free catharsis by any of the well-known drugs is one of the first things to employ. Employment of alkaline drinks should be freely used. When I first see a patient during or after the first or subsequent seizure I advise a hot pack of blankets wrung out of water as hot as can be borne by the hands, which should be kept up until free sweating has been established.

Veratrum is one of our stable remedies which reduces the heart's action and causes general relaxation between seizures. I have abandoned the treatment in use a decade ago for the later employment of alkaline treatment. Fischer's solution is perhaps the best antacid for routine treatment, and should be freely used both by the mouth and by enema, for as we observe flushing of the kidneys and bowels are the treatment *per se* to eliminate the toxins as quickly as possible. I nourish my patient with buttermilk, which is poured through the tube, as all liquids have to be administered. Feeding, however, should not be a matter of concern until some hours after medical effort has been employed, then I give one quart at a feeding, which in its effect further aids the kidneys in their effort to eliminate the poisons.

Coma usually lingers, sometimes for several hours, after convulsions have ceased. As is well known our list of drugs available in the treatment of this distressing condition is rather limited, and one should refrain from giving treatment just to be satisfying the demands of friends. Some have recommended administration of thyroid gland in fifteen to twenty grains daily as a preventive. Personally I have not employed it in my cases.

The uterus should be emptied as soon as possible after dilatation has become sufficient to enable the use of forceps, and many cases have been relieved by the prompt delivery of the child. The emptying of the uterus, however, is not always followed by relief of the patient, and all one's ingenuity may be further called upon to care for the still eclamptic patient.

I beg indulgence for the report of two cases occurring during many years of practice, both typical for their well-marked symptoms:

The first case occurred more than twenty-five years ago while in practice near Williamsburg, Ohio, and came to me without any previous acquaintance. Mrs. S., a multipara, was stricken before delivery, and I was hastily summoned and found her in a convulsion, which was followed by a short period of profound coma, only to be seized again with a second convulsion in thirty minutes, then deep slumber. In spite of remedies then used, such as veratrum, chloroform, calomel, and all other remedies which seemed useful, the seizures continued with fateful thirty-minute regularity. Dr. Redrow of Williamsburg was called in consultation, and fully indorsed my line of treatment. Six hours after onset of convulsions labor set in and she was delivered of twins. Delivery was immediately followed by a series of convulsions every fifteen minutes. Following each convulsion

severe hemorrhage threatened the life of the patient. Both babies were born alive. The convulsions continued with fatal regularity until she had eighty in all, and then death ended the scene.

Mrs. L., New Richmond, Ohio, aged eighteen years, primipara, history negative, a well-developed woman of dark type, weight 140 pounds, was delivered by Dr. Caskins of New Richmond, June 23, 1916. Delivery normal with no signs of future trouble. Patient seen first in consultation with Dr. Caskins June 24 at 8 A.M. First convulsion June 23, five hours after delivery, which was followed by coma until 3 A.M. of June 24, at which time she was seized with the second attack, when I was called to see her. On arrival at 8 A.M. I met her doctor, and we hastily formed our line of treatment. I first ordered her encased in hot steaming blankets, which were renewed with hot ones every fifteen minuts, and kept up for four hours, when patient was changed to a dry bed. An examination of urine showed it to be very heavily loaded with albumin, and when subjected to heat it assumed a thick, creamy appearance, and solidified in the tube. At intervals of one and one-half hours the patient was given one quart solution composed of one drachm of sodium chloride and one drachm of sodium bicarbonate dissolved in the water. One pint of the same solution was also introduced into the rectum every hour and a half. Four hours after first introduction of the alkaline treatment, urine showed increased quantity and less albumin. The alkaline treatment was ordered continued until next morning, when a like quantity of buttermilk was substituted at four-hour intervals. Early in the treatment twenty minims of veratrum was administered hypodermically, and at 12 o'clock noon I did a phlebotomy, and drew a pint and a half of blood from the left arm. Calomel and soda (three grains) were given during the forenoon. Fourteen convulsions ending at 3 P.M. June 24 threatened the life of the patient, who then continued comatose for sixty-three hours from onset of the disease, when consciousness dispersed the clouds, and for the first time during the period the patient recognized friends, but for two or three days complained of a sore throat caused by frequent introduction of the stomach tube. No further trouble occurred and the patient proceeded to an uninterrupted recovery.

CONCLUSIONS.

1. Whenever possible a case of pregnancy should be seen and examined at least once a month during the first seven months, and every two weeks during the last sixty days.

2. A careful record of the urine examination should be kept and treatment instituted accordingly.

3. The condition of the secretions should be carefully watched, and edema of the hands and feet should put us on our guard. Headaches of a persistent type should be accounted for.

4. When nephritis once manifests itself, every effort should be made to control the condition.

5. Diet and exercise should be repeated and acidosis guarded against.

6. Treatment of eclampsia begins, or should begin, by instituting prophylactic measures very early in pregnancy.

7. Any case that shows signs of possible eclampsia should at once become a hospital case where possible, in order that we may be prepared to give our patient the full advantage of all necessary means to meet the emergency of forceps delivery, or Cæsarean section.

8. Hyperacidity should be met by free catharsis with salines, preferably by diet regulation; by fresh air; by the use of Fischer's alkaline treatment per rectum by the Murphy drip method or by its use intravenously carried over a period long enough to reëstablish proper activity of the kidney function. The so-called "imperial drink" can be used where the patient can take large quantities of fluids by mouth. Warm alkaline bath (½ pound of soda bicarbonate in tub of hot water) is useful to produce sweating.

9. When eclampsia is ushered in by spasm, hot packs and a continuation of the

above methods, associated with bloodletting, and in many instances spinal puncture, has proven of value. Forty or even 60 Cc. of spinal fluid may be withdrawn at one puncture with great relief to the cerebral pressure. Some authorities advise repeating the puncture every twelve or twenty-four hours, as long as necessary to clear up the case. The value of spinal puncture is usually underestimated.

10. As before stated, nutrition should be kept up, if no other way than by use of the stomach tube.

11. Veratrum viride tincture probably is our most reliable drug for the reduction of blood-pressure. The dose should be varied to meet the emergency, beginning with 15 to 30 minims hypodermically every hour until the patient has a pulse remaining below 80, and if it goes down to 50 there need be no special alarm. The use of this drug should be kept up in amount sufficient to keep down the pulse and blood-pressure until the case is out of danger, for one, two, or even four days.

THE RELIABILITY OF SERUM TESTS FOR SYPHILIS.

The *Lancet* of May 4, 1918, states that the demonstration of the *Spirochæta pallida* by the microscope and the Wassermann test of the blood serum and the cerebrospinal fluid have made the diagnosis of syphilis at least as accurate as that of almost any other disease. It would be easy to quote large numbers of authors who have testified to the reliability of the Wassermann test, but it may suffice to mention the experience of Harald Boas of the Statens Seruminstitut, Copenhagen, who has been so prominent in perfecting its technique. This investigator reports in his own experience the following positive results with the serum of syphilitic patients in different stages: Primary, 99 out of 137. Untreated secondary, 437 out of 437; secondary relapses, previously treated, 292 out of 310. Untreated tertiary, 129 out of 132. Treated latent, within the first three years, 143 out of 363; treated latent after the first three years, 87 out of 185. Tabes, untreated, 25 out of 25; treated tabes, 15 out of 33. General paresis, 243 out of 243. On the other hand, with the serum of 1927 patients suffering from 94 diseases other than syphilis he obtained only 5 positive reactions. Three of these (out of 60 such cases) were under general anesthesia; 1 (out of 3 such) was a case of lepropsy; and 1 (out of 73 such) was a case of scarlatina. There is little wonder that syphilologists of unrivaled clinical experience the world over have availed themselves eagerly of laboratory aid and become so dependent on it for guidance in their management of syphilis.

Though it cannot be denied that the laboratory has served the syphilologist well in this matter, it must be admitted that there is some little risk that the syphilologist may come to lean too heavily on it. He may lose sight of his responsibilities in the matter of clinical examination, and allow himself to be led astray, not perhaps by the pathologist's report, but by his own interpretation of the latter. An example of this error is to exclude syphilis solely on the strength of a negative Wassermann reaction, and another error, which is fairly common at the present time, is to diagnose a refractory sore on the leg as a syphilitic ulcer on the strength of a positive Wassermann reaction, when the culprit is not the *Spirochæta pallida* but a fragment of shrapnel or a piece of trouser cloth at the bottom of a gunshot wound; in this instance a little reflection would show that syphilis does not protect against all injuries or other disabilities. The remedy for such errors is a closer alliance between the clinician and the pathologist. The road to a true understanding of the diagnosis and treatment of syphilis lies through the laboratory, and the clinician who will take the trouble to make himself intimately acquainted with laboratory aids to the diagnosis of syphilis will find himself recompensed for the trouble by the smoothing away of much that may be perplexing him now.

EDITORIAL.

DIAGNOSIS AND TREATMENT OF EPIGASTRIC PAIN.

It is not our intention to discuss in this article the whole subject which is covered by the above title, as it is too large a theme. The point that we wish to emphasize is the need of bearing in mind the fact that many conditions in the right upper quadrant of the abdomen affecting widely different tissues nevertheless produce symptoms so nearly identical that a differential diagnosis may be difficult.

At one time it was thought that if a history of gall-stone colic, or of jaundice, was not present the physician had a right to consider that the gall-bladder should be excluded as a factor in producing the symptoms in a given patient. Now we know that a majority of patients who have gall-stones do not have jaundice, that many of them carry these stones for a lifetime without any symptoms indicating their presence, and it is only when a stone lodges in such a position as to produce mechanical obstruction, or erodes the mucous membrane so as to produce a solution of continuity whereby infection can occur, that symptoms develop. We recognize that sharp pain in the right upper quadrant may not only be due to gall-stone colic but to cholecystitis, gastric and duodenal ulcer, and, possibly, pyloric spasm, and, in addition, that more or less acute or chronic inflammatory processes in this same quadrant may produce strictures or adhesions which in turn develop obstructions or induce pain. Not only is this true, but sometimes a malignant growth involving the gall-bladder, or the opening of the common duct into the intestine, may produce symptoms of obstruction and pain before there are any other evidences of malignancy.

We think it may be stated, without fear of contradiction, that no abdominal surgeon enters the right upper quadrant of the abdomen with perfect assurance that his preoperative diagnosis will be confirmed. In many instances it is much better to state that there is trouble in that region needing operation than it is to state a definite diagnostic proposition before the incision is made.

The adhesions which sometimes develop as the result of acute inflammatory processes in the gall-bladder and adjacent tissues often produce symptoms which lead to operation, and such operation may, on the one hand, give relief, or may reveal adhesions which it is not safe to break up; or, again, if these adhesions are broken up, others take their place in the process of convalescence, so that the ultimate condition of the patient is very much like that before the operation was performed. In other words, it not infrequently happens that a patient comes to a physician, with a ready-made diagnosis of dyspepsia, who is really suffering from a definite organic lesion in the right upper quadrant which it is impossible to relieve by diet or by medicines directed to the digestive state. In these cases the *x*-rays are sometimes of diagnostic value, and, again, they entirely fail to give us the information that we desire. Even an examination of the gastric contents by modern methods may mislead the physician, since a reflex irritation produces such changes in the gastric or duodenal secretion as to lead to fictitious conclusions.

Incidentally, in this connection, we may remind our readers that sometimes these attacks of epigastric pain, or pain in the right hypochondrium, are really manifestations of a crisis of locomotor ataxia, and without doubt a considerable number of ataxics have been operated upon with the idea that a lesion existed in the gall-bladder, or stomach, when in reality it was in the spinal cord or nerve trunks.

Friedman has recently called particular attention to symptoms due to adhesions about the gall-bladder as productive of what is commonly called dyspepsia. He believes

that the two important diagnostic aids, which enable us to determine that such adhesions are present, consist in the presence of tender spots or pressure points to the right of the spinal column, posteriorly; and, second, shadows or deformities largely revealed by *x*-ray examination. We confess that we have never yet considered tenderness in the back as being pathognomonic of adhesions. Undoubtedly gall-stones produce irritation and will produce a similar hyperesthesia or painful condition, but Friedman asserts that these points of pain on deep pressure cannot be elicited in dyspeptics who are free from pericholecystitis. Indeed, he asserts that since he has learned to appreciate the value of these pressure points he has not fallen into any errors in connection with the diagnosis of pericholecystitis and cholecystitis; or, in other words, that he has no difficulty in separating these conditions from gastric or duodenal ulcer and from appendicitis. The diagnostic factors from the *x*-ray standpoint he believes to be that the *x*-ray reveals a high position of the stomach, with the pylorus drawn to the right and a residue remaining after six or eight hours. Friedman believes, however, that the pressure points in the back are superior to the findings of the *x*-ray in importance, since he has met with instances in which the *x*-rays were negative, the pressure points positive, and the operation revealed pericholecystitis or cholecystitis.

In such conditions it is manifest that drugs can do little good except as palliative agents, and that rules as to diet, even when they are most skilfully prescribed, will give little or no relief. The patient must decide with the physician the question as to whether his discomfort and pain are so great that he is willing to submit to an operation for relief. Of course, if an acute inflammatory process is present, the opinion of the patient as to what is to be done is to be given little weight and the physician or surgeon must advise or insist upon surgical interference at a proper time. Where more or less constant grumblings and rumblings and other evidences of distress bring the patient to the physician, and yet there is no impairment of the general health and no history of a previous attack of acute cholecystitis, which indicates that a subsequent severe attack may jeopardize the patient's life, the wish of the patient as to what shall be done can be dealt with with more respect than if there is an acute history. On the one hand, however, it is to be recalled that there is always the danger of the lesion becoming gradually worse, both as to its development of symptoms and as to its difficulty of relief by operative interference, and, on the other hand, it is to be remembered that, not infrequently, the traumatism of postoperative adhesions produces symptoms after the operation which may be just as annoying to the patient as those which existed before resort was had to the knife.

There are few conditions in medicine in which the responsibility of the physician and surgeon is greater than in this type of case. Nothing is more humiliating than to have a patient inform the physician, after many months of treatment, that he has gone elsewhere and that an operation has revealed an organic lesion, and, again, physicians of experience will recall cases in which operation has been performed for the relief of symptoms which make the patient uncomfortable, but do not jeopardize life, and in which by some mischance death follows operative interference. The question is, not what surgery can do, but what it ought to do, and advice as to entering the right upper quadrant should be given, bearing in mind the words used in the marriage ceremony, to wit: that it is not to be entered into lightly, but reverently, discreetly, and in the fear of God.

OPERATIONS, ANESTHETICS, AND THE HEART.

It is a very prevalent idea amongst the profession and the laity that a "bad heart" is a contraindication to the employment of an anesthetic. Amongst the profession this view is becoming materially modified, because it is getting to be more and more clearly recognized that the presence of a

murmur, indicating a valvular lesion, in no way indicates that the heart is materially impaired as to its function, since the leakage or obstruction at an orifice may be entirely compensated for by functional activity. So, too, the various methods of investigating cardiac function and pathology, during life, have enabled us to separate cardiac irregularities due to purely functional disorders from those which are definitely dependent upon changes in the heart muscle itself.

So far as valvular lesions are concerned aortic regurgitation and mitral stenosis are the two which should make the physician particularly careful when considering anesthesia for an operative case. In both of these, however, the mere existence of the lesion is not so important as the state of the heart muscle, and, in mitral stenosis in particular, the mere presence of a presystolic murmur, not associated with cardiac irregularity induced by partial or complete heart-block or auricular fibrillation, is not a contraindication to an anesthetic, whereas, on the other hand, any one of these conditions without a murmur should be considered with the utmost caution. In such patients confirmation of the clinical diagnosis by means of the polygraph and electrocardiograph will, of course, make the physician much more sure of his ground.

When auricular fibrillation is present, or complete heart-block is found, full doses of digitalis will materially increase the safety of the patient, whereas in partial heart-block atropine in full doses will be advantageous, not only so far as the heart is concerned, but also as to the vascular system itself. Atropine is now being recognized so largely as of great value in the prevention of shock, and in combating it when it is threatened, that physicians should bear in mind the fact that if auricular fibrillation is present it must not be used. While it is perfectly true that the presence of any myocardial lesion, or of partial rupture of compensation due to valvular disease, makes a patient an unfavorable risk for surgical anesthesia, it is also true that, if an operation is absolutely essential, the skilful use of an anesthetic does the circulatory apparatus less harm than the psychic and nervous shock induced by an attempt at operation without an anesthetic.

In the early part of this year Mackenzie pointed out in the *British Medical Journal* that many "bogeys" have been raised at one time or another about the heart being unable to stand anesthetics, and in a later issue of the *British Medical Journal* Blomfield heartily indorsed this view and stated that he has on a great many occasions given anesthetics with perfect safety and but little anxiety to persons who had been assured that their hearts could not stand it. Blomfield believes that the opinion is much too frequently given that a patient "must not have an anesthetic on account of his heart." Such advice, in many instances, brings in another factor of danger because of the alarm which it induces, and Blomfield makes the plea that the mere presence of valvular disease shall not lead the physician to utter a warning, since, when the patient is confronted with the necessity for an operation, an additional and unnecessary anxiety is cast upon him.

Finally, Blomfield says that it is well to bear in mind that anesthetics, properly given and chosen, make little call upon the heart, and that when an operation is necessary it is extremely seldom that it should be banned upon the score of cardiac risk. In some of these cases in which the nervous element is a very large factor and fear dominates the patient, there can be little doubt that the preliminary use of morphine is a distinctly advantageous procedure.

Closely connected with this topic is the field of anesthetics in tonsillar and adenoid operations. Some laryngologists strongly advocate local anesthesia, as in the article of Blackshear published in the Progress columns of this issue of the GAZETTE. The views of other laryngologists of large experience are expressed in articles which will be published in the November issue of the GAZETTE.

PAINFUL BACK.

Partly because the use of the *x*-rays has added very materially to our knowledge of conditions involving the bony and ligamentous portions of the body there has been a very great increase during the last few years in our ability to differentiate the causes which produce pain in the lower dorsal or lumbar region. Another factor, which is industrial in its origin, has been the passage of the Workmen's Compensation Acts, under which it is essential to determine whether pain in the back really exists, and, if it does, to determine, in addition, how serious and persistent will be its cause. The old and familiar diagnosis of lumbago is comparatively rarely used, although, without doubt, a certain number of cases of painful back are suffering from so-called lumbago or rheumatism of the great muscles of this region.

The question of sacroiliac strain and sprain has been debated pro and con by a large number of surgeons and physicians. Doubtless in many instances this diagnosis is made without an adequate basis, but the point for the general practitioner of to-day to remember is that a painful back is a symptom and not a disease, and, in addition to prescribing palliative measures, it is his duty, if possible, to find the underlying cause. The laity are prone to think that a backache is due to disease of the kidneys, but except in certain cases of pyonephrosis, pyelitis, or floating kidney, the kidneys almost never, when they are chronically diseased, produce backache.

The various causes of backache are those which are induced by different types of arthritis; another cause is traumatism, and not infrequently the injury not only produces arthritis but, by damaging the tissues, permits gouty deposits on the one hand, or bacteriologic infection on the other. In other instances the ligaments may be torn from sudden stress and strain, and more rarely a fractured transverse process results from a severe blow or fall. The *x*-ray may not be able to reveal arthritis until the condition is far advanced. So, too, it may fail to reveal a tear of a ligament, but if the *x*-rays are used in such a way as to get at the spinal column from different angles definite organic changes often will be revealed.

Other causes of backache are those which are dependent upon definite disease of the vertebræ, and those dependent upon pelvic displacements in women. Again we have those which are due to faulty posture, whereby strain is put upon certain muscles and ligaments and undue pressure is exercised on certain portions of the intervertebral cartilages. This matter of postural stress and strain does not receive the attention which it deserves. Many men and women carry their weight in such a faulty manner that backache inevitably occurs, and in such cases pressure along the spine and over the muscles which hold the patient erect will often induce considerable pain, even although no actual disease is present. Such cases are relieved by exercises which will improve posture and strengthen weak muscles, care being taken that the exercise is not too vigorous at the beginning. Raising or lowering the heels of shoes, on both feet or on one foot, may be a useful measure, and in women in particular, especially if they have borne children, abdominal support by putting the weight of the abdominal viscera in the normal position will often give relief. Many of these cases are diagnosticated sacroiliac strain when this condition does not really exist, but should be called sacroiliac stress.

An interesting article on this subject has been published by Sever in the *Boston Medical and Surgical Journal*. He wisely points out that a diagnosis of sacroiliac strain too often is made, although not denying that this condition often exists. Although he commends the use of strapping in this condition, he states that we should always carry the plaster from in front of the anterior superior spine on one side to in front of it on the other, pulling it as hard as possible, and that a felt pad about half an inch thick should be placed over the sacrum and should extend up the lumbar spine in order to fill in the hollow and provide support.

In regard to the pain which is sometimes complained of by patients as extending from the sacroiliac region down back of the leg even as far as the calf or the foot, Sever states that this pain is attributable to pressure on the nerves of the sacral plexus,which lie on the anterior surface of the joint in the pelvis, but he does not believe that it is possible for enough of a slip to occur in the sacroiliac joint to exercise such pressure, any pressure being in reality due to a local congestion which involves the tissues about the sacral cord.

In this article we have not discussed psoas abscess or Pott's disease as a cause of backache. These conditions are never to be forgotten, particularly in the young.

Sever tells us that in eighty cases of painful backs as a result of injuries examined for the Massachusetts Industrial Accident Board there were only one or two which seemed to be cases of sacroiliac sprain against twenty-four cases of compression fracture of the vertebræ, which he believes is a very common condition and one frequently overlooked after injury.

Where actual relaxation of the sacroiliac joint is present Sever thinks that the statement of the patient that he feels "'as if he were breaking in two" is pathognomonic. Finally, he adds a word of caution about back pain, to wit: never be content with an examination which does not include the *x*-ray, especially in cases of trauma.

THE TREATMENT OF INFLUENZA

There seems to be little doubt that the epidemic of influenza, which, according to the daily papers, is exceedingly prevalent wherever there are large aggregations of men, has been brought to this country overseas, as it resembles in every particular the epidemic which for some months past has been prevalent in Europe and England. The characteristics of it do not differ in kind from those which were so frequently seen in the great epidemic of thirty years ago. It strikes hard those who are devitalized and weak, but perhaps the most noteworthy point concerning it is that young men, in the very prime of life and in prime condition, often present the most virulent manifestations of the disease. For this there seems to be no adequate explanation except that living in large communities they may get a particularly heavy dose of infection, or more probably the dominant factor lies in this, namely, that they do not yield immediately to the disease when attacked, but keep on their feet for two or three days, until as a rule they are seriously ill. In other words, beyond any doubt the first thing in the treatment of influenza is early rest in bed. This seems to be more essential in this disease at the time of onset than in any other infectious malady, and remedies are practically useless if rest in bed is not resorted to.

For the relief of the pain which is felt in different portions of the body, it has been our experience that two or three grains of cinchonidine sulphate with five grains of aspirin every three or four hours does the most good and seems to aid in combating the infection. After pulmonary symptoms have well developed we have found digitalis of little value, as indeed it is in most acute infections. Either because of the action of the poison upon the heart muscle or because of the high fever which is often present, it fails to produce any good results. The best results seem to accrue from the use of caffeine and whisky.

A peculiarity of the disease in many cases is that the heart does not seem to be so severely attacked as is the vascular system aside from the heart. Not infrequently the heart sounds are clear and forcible, yet the pulse is almost lost and capillary paralysis with lividity and cyanosis dominates the scene. After this has been present for some hours pulmonary edema develops and the patient passes away within a comparatively short space of time. Caffeine and camphor and atropine seem to be the remedies which should be freely used at this time. The alcohol lends a force to the body which is peculiarly lacking in this disease and seems to do good by equalizing the circulation. So too the administration of 10 minims of the tincture of belladonna every four hours seems to aid

in combating toxemia or at least the vascular results of it.

Concerning prophylaxis. Isolation of the sick from the well of course is to be practiced. Attendants should wear a gown and particularly a gauze mask over the nose and mouth. A gargle composed of half a grain of ethyl cuprein hydrochloride in a pint of water with enough thymol to be of the strength of 1:1500 is useful, and the nasal cavities may be sprayed with a weak solution of menthol, oil of gaultheria in liquid petrolatum as a protective. Watery sprays, or douches, which wash away normal secretions, designed to protect one from infection, are unwise.

FURTHER CONTRIBUTIONS TO THE STUDY OF SHOCK.

Since it seems well established that our conception as to the underlying factors which produce the phenomena termed shock were wrong; that there is not an exhaustion of the vasomotor center, not an acidosis, at least as a causative factor, not a primary suppression of adrenal secretion, not a sudden cardiac breakdown, not an acapnea, not a fat embolism, not a bleeding into the veins of the splanchnic area, the blood being really in the capillaries, according to Cannon; the doubt as to either the rational nature or the efficacy of the accepted treatment for the condition seems not unreasonable.

Granted, as the result of trauma, a sudden fall of blood-pressure due to a capillary widening of sufficient degree to allow most of the body blood to accumulate in these vessels, a racing engine, the heart, is the logical consequence, together with deficient oxygenation, deficient acid elimination, deficient action of the centers, deficient secretion of the ductless glands; indeed, an impaired function of the body in all its parts. That the blood accumulates in the superficial capillaries seems improbable because the surface is always cold, wet, and blanched.

A secondary effect of the low blood-pressure is shown by Richet and Flament (*La Presse Médicale,* 16 Mai, 1918), who have noted a pronounced reduction in urea elimination following severe wounds; indeed, they hold that the study of this elimination gives valuable prognostic indices. The theory that shock following trauma, even the so-called secondary shock, may be due to toxic elements derived from proteolyzed soft tissues, particularly muscles, has apparently been disproved by Vallée and Bazy. They found that even when muscle underwent bacterial proteolysis there resulted no toxicity other than that inherent in the bacteria. Hence secondary shock is due to infection. When the shock is not dependent upon bleeding, acacia 6 per cent in 0.9 salt solution is coming into a steadily increasing popularity, since it is easily prepared, raises and maintains blood-pressure, and seems quite as efficacious as whole blood. Soda bicarbonate, which in two-per-cent solution injected into a vein will maintain blood-pressure much longer than will normal saline, leaped into sudden favor because of the recognition of the acidosis which always accompanies severe shock and which it tends to correct. Whilst the physiologist is industriously searching for the underlying cause and individually vaunting inhalations varying from oxygen to CO_2 and intravenous injections from mucilage to blood, the surgeon continues to rest and treat his patient, puts his head low, gives him hot drinks containing soda or sugar, or both, follows the indices of surgery when occasion offers, and wonders how many fatally shocked men have been saved or will be saved by means discovered in the laboratory.

URINARY ANTISEPTICS.

For the last twenty years the surgeon, the internist, and the specialist have placed an abiding faith in the efficacy of urinary antiseptics, which they have justified in part on various non-conclusive laboratory tests, but in the main on the circumstances that when patients recovered from an existing infection, or escaped a threatened one, this desired result was attributed to the efficacy of this antiseptic treatment rather than to the curative power of a body

not too seriously weakened by hypermedication. Boric acid held the field for some years, quite disregarding the fact that it is of practically little if any value and is directly and very distinctly prejudicial to the digestive processes. Thereafter came salol, which was usually combined with boric acid, and often given in full doses long continued. Finally, urotropin or hexamethylenamine took complete possession of the field, and, except on the part of a few conservatives who clung to their earlier beliefs, has held undisputed sway as a drug which may be given in non-harmful doses and which when excreted in its changed form by the kidneys converts the urine into an active antiseptic, thus acting beneficially upon any infected area of the urinary tract as a potent continuous or intermittent lavage.

Davis and White (*Journal of Urology*, Volume II, No. 2) note that the ideal urinary antiseptic must be a drug which is chemically stable, non-toxic, and non-irritating to the urinary tract; which is antiseptic in high dilution in urine, regardless of the reaction of the latter; and which is eliminated unchanged in high percentage by the kidney. There is no such drug known. A consideration of the properties possessed by phenolsulphonephthalein, however, shows that this compound comes very close to filling all the above requirements. Phenolsulphonephthalein is chemically stable, nontoxic, and non-irritating, and is eliminated by the kidney with almost incredible rapidity and completeness; but it has no antiseptic properties, excepting in water in its free acid form. (Clinically it is used as the mono-sodium salt.) This remarkable compound, synthesized in 1898 by Sohon, at Remsen's suggestion, investigated later in Abel's laboratory, and introduced into clinical use by Rowntree and Geraghty twelve years later, has become the most widely used and the most satisfactory of all the tests of renal function. This is due to the remarkable rapidity and completeness with which phenolsulphonephthalein is eliminated by the kidney, to its non-toxicity, and to the ease with which it lends itself to colorimetric estimation. As evidence of non-toxicity, Rowntree and Geraghty have given one-gramme doses to dogs without evidence of renal injury. Its marvelous rapidity and completeness of elimination is realized when one considers that a 6-mgm. dose, given intravenously, and therefore diluted about one million times by the blood stream, appears in the bladder in about two minutes, and after one hour 6 to 70 per cent has been excreted by the normal kidney. Furthermore, about 30 to 35 per cent of this amount appears during the first fifteen minutes, and about 40 to 50 per cent during the first half-hour. In view of these remarkable properties it was thought worth while to attempt a modification of the phenolsulphonephthalein molecule, with the hope that an antiseptic compound might be produced which still retained the properties of the original drug.

Of the urinary antiseptics in common use, hexamethylenamine is by far the best, but has very definite limitations, owing mainly to the fact that an acid medium is essential for the liberation of formaldehyde. Furthermore, the necessity of concentration, and time for the accumulation of formaldehyde in antiseptic amounts, largely destroys the value of the drug for kidney antisepsis; for bladder antisepsis in cases with polyuria or frequent urination, except when retention in some form is present; in cases of urinary fistula, notably postoperative prostatics during the period of incontinence, and in cases with continual bladder drainage, as in true incontinence or with retention catheter; and for urethral antisepsis no matter what the infection. The greatest usefulness of hexamethlyenamine is in bladder prophylaxis in cases in which the above urinary conditions are not present.

Hinman states that "the value as internal urinary antiseptics of other substances such as salol, oil of sandalwood, salicylic, boric and benzoic acids, is very limited," and concludes that there is no known drug with properties even approaching those of an ideal urinary antiseptic.

Antisepsis in urine is quite a different thing from antisepsis in water. As will be

shown below, and in subsequent papers, there are numerous compounds which are germicidal in high dilution in water, but which lose this property entirely when diluted in urine, and which even permit the growth of organisms in urine when in relatively strong concentration. This astonishing fact has proved to be a great obstacle. It may be readily seen that the compound, the antiseptic power of which is due to its acid or basic properties, would become inert in urine on account of the buffer action of urinary salts.

The effect of the reaction of the urine in aiding or hindering the germicidal activity of a drug is an all-important factor. Henderson and Palmer have shown that the hydrogen ion concentration of urine is normally subject to a considerable range of variation (point 4.8 to 7.4), and that the average of this range is point 6.0 on the hydrogen ion scale, corresponding to 0.000001N acid. The importance of the reaction of urine when used as a culture medium has been pointed out by Shohl and Janney, who find that the colon bacillus fails to grow in urine at certain definite acid and alkaline end-points. In order to eliminate possible error, due to strongly acid or alkaline urine, the hydrogen ion concentration of each specimen of urine to be used for antiseptic experiments was determined, and the specimen rejected if the reaction was not approximately that of average normal urine—that is, point 6.0.

Phenolsulphonephthalein, in its free acid form, although almost insoluble, is nevertheless germicidal (against the colon bacillus, according to the arbitrary standard described above) in a dilution of 1:1000; that is, it has about 50 times the strength of phenol. In urine, however, even in almost saturated solution, phenolsulphonephthalein permits the growth and development of the colon bacillus. A suggested explanation of this loss of power is that the watery solution kills by virtue of acidity, whereas in urine the acid properties are lost on account of the buffer value of the urinary salts. Furthermore, the mono-sodium salt, the form used clinically, has no germicidal action even in water, and in urine permits the growth of colon bacillus even in a 1:200 dilution. The silver salt is extremely germicidal in water (having 5000 times the strength of phenol), but in urine the silver is precipitated by the chlorides, and the germicidal strength, due to the silver ion, is lost.

In view of the hitherto overlooked fact that numerous actively germicidal compounds lose their strength (due to an as yet unexplained cause) when simply diluted with urine in a test tube, the value of every drug used for the purpose of urinary antisepsis ought to be questioned until its antiseptic strength in urine has been experimentally demonstrated.

It has been possible to establish a certain relationship between chemical structure and renal excretion, and to predict, with a reasonable amount of accuracy, which drugs will and which will not be excreted. The synthesis of germicidal compounds, very closely related to the types excreted, has been accomplished; one of these compounds, rhodamine, was excreted and would have been satisfactory but for the interfering action of the urine; another compound, "mercury fluorescein," has been found to be rapidly excreted and to produce germicidal urine.

It is hoped that these experiments may call attention to the inadequacy of the urinary antiseptics in general use, and stimulate interest in the possibilities offered by synthetic chemistry. The investigation is being continued and the properties of various related compounds are being studied. Some of these compounds are old and well known, and others are new and have been synthesized so as to contain various chemical groups which are known to possess desired biological properties.

The mercury fluorescein contains organically bound mercury—*i.e.*, the mercury is present in a non-ionic form. It is stable, rapidly excreted, and is antiseptic in urine. If its non-toxicity be established it may prove the long-wished-for efficient medicament for the usual colon bacillus infections of the urinary tract.

REPORTS ON THERAPEUTIC PROGRESS.

THE REMOVAL OF TONSILS AND ADENOIDS UNDER LOCAL ANESTHESIA.

To the *New Orleans Medical and Surgical Journal* for June, 1918, BLACKSHEAR contributed a paper favoring local anesthesia.

In writing this paper Blackshear's purpose dealt briefly with the salient points of the subject and avoided dealing with statistics or quotations from other writers.

He thinks it hardly necessary to dwell upon the advantages of local anesthesia over general anesthesia, and mentions a few facts which make it more desirable in doing throat work. First, there is less risk from cardiac or respiratory failure, and other serious complications, for pneumonia and acute nephritis are practically unknown following the use of local anesthesia, which cannot be said for general anesthesia.

Since adenoidectomy and tonsillectomy do not come under the head of surgery for saving life, it behooves us to make it as safe as possible from all angles. Then, most patients who are old enough to reason prefer not to go to sleep for this work when they can be assured that it will not be a painful procedure. It is also more desirable from an economic point of view, since it requires fewer assistants and less gauze for sponging, as bleeding is reduced to a minimum by the small quantity of adrenalin which is used in the injection for anesthesia. Lastly, it allows the surgeon to concentrate his attention on the operation, instead of dividing it between the surgical work and the anesthesia.

The great disadvantage to local anesthesia in this work is its impracticability in children who are too young to reason with, and unfortunately the majority of the patients requiring this surgery are to be found among the children, where there is no alternative but to use general anesthesia.

The first step in local anesthesia for throat work is to abolish the throat reflexes, which is very satisfactorily accomplished by first administering a hypodermic of morphia, from an eighth to a quarter of a grain, taking into consideration the age and size of the patient, which brings about relaxation and relieves anxiety. This hypodermic should be given about fifteen minutes before the operation, and it is advisable to give a 150th grain of atropia with the morphia for its sedative effect on the salivary secretion, which, when it accumulates, is liable to cause coughing and swallowing. The reflexes are further abolished by swabbing the field of distribution of the glossopharyngeal nerve, which includes the pharynx, fauces, and posterior third of the tongue, with a 20-per-cent solution of cocaine. [This seems to us dangerous.—ED.]

The reflexes being controlled, the anesthesia proper is obtained by injecting about a drachm of a one-half of one-per-cent solution of novocaine, which contains one minim of adrenalin chloride solution one to one thousand, into the bed of the tonsil. In the absence of novocaine, Schleich's solution of cocaine No. 1, or apothesine, one-half of one per cent, may be used in the same quantity.

The injection is made by inserting the needle, which should be a long spinal needle, between the anterior pillar and the tonsil until it reaches the bed of the tonsil at three points—one at a point midway between the superior and inferior limits of the tonsil, one in the supratonsillar fossa, and one near the base of the tongue. The object is to block off the nerve supply of the tonsil in its bed without infiltrating the tonsil itself, as this would interfere with recognizing the lines of cleavage.

The field being anesthetized, the tonsil is pulled out of its bed and kept on tension by two or three tenacula while it is dissected free from the anterior pillar by means of a sharp scalpel. The incision is begun at the lower limit of the tonsil, where it joins the base of the tongue, and is carried upward and over the supratonsillar lobe to meet the posterior pillar at the upper extremity of

the tonsil. The anterior pillar being free, the tonsil is pulled forward by means of one or two additional tenacula until the junction of the posterior pillar is accessible, when the original incision is prolonged from above downward, freeing the posterior pillar along the whole length of the tonsil. The tonsil being freed from both pillars, it is then removed from its bed by keeping it on traction and severing the little connective tissue fibers which hold it in with a sharp scalpel, hugging the tonsil closely, from below upward.

If this technique is closely observed there is little or no hemorrhage, but persistent bleeding points are caught up with artery forceps and ligated in mass.

The advantage of this technique over snare methods is that it is more accurate, and, being more accurate, the percentage of satisfactory results is higher. Secondly, there is less traumatism, which means a shorter and less painful convalescence. Thirdly, this method is applicable to all kinds of tonsils, which cannot be said for other methods.

In regard to adenoidectomy under local anesthesia, the reflexes are abolished in the same manner as stated above, and, with the soft palate retracted out of the way, the adenoid mass is infiltrated with one of the above-mentioned solutions by means of a long, curved needle. This accomplished, a curvilinear incision is made around the lower margin of the growth, thus freeing it from its lower attachment, so as to facilitate the curette in scooping it out in mass.

The infiltration here seems to assist the engagement and scooping process of the curette, while the incision limits the raw surface made by the removal of the growth and forestalls the hanging of the growth at its lower extremity.

Another important point in adenoidectomy is blocking off the communication between the oropharynx and laryngopharynx by forcing the base of the tongue against the posterior pharyngeal wall with the tongue depressor, thus preventing aspiration or swallowing of the growth.

There is much less bleeding in adenoidectomy under local anesthesia, but in case of a persistent bleeding point which is too high for ligature, the nasopharynx is plugged with iodoform gauze, which is not to remain longer than twenty-four hours.

In closing, Blackshear emphasizes the importance of using a sharp knife and curette in doing this work.

RENAL INFECTIONS.

Writing on this subject in the *Journal of the American Medical Association* of May 18, 1918, CULVER, HERROLD and PHIFER tell us that only thirty of the 116 patients studied were treated until completely cured. Their standard for judging a complete cure was not merely a complete relief of symptoms, but two successive negative cultures from five to seven days apart.

The treatment was more or less routine. Those patients suffering from colon bacillus infections were given internally hexamethylenamine in moderate daily doses for a week, alternating with the administration of alkali for a week. The alkalies were used to the point of securing a distinctly alkaline urine, and for this purpose the writers employed sodium citrate or sodium bicarbonate. In coccus infections, hexamethylenamine was used continuously and prescribed with either acid sodium phosphate or benzoic acid. Regardless of numerous reports to the contrary, there seem to be variable degrees of improvement secured by the proper administration of hexamethylenamine. It is especially noticeable when this drug is alternated with alkalies in colon bacillus infection.

Locally the pelves and calyces of the infected kidney or kidneys were treated by irrigation with from 1 to 3 per cent silver nitrate every fifth day, a culture being taken before each lavage. The number of irrigations varied from one to twelve to secure the desired results; the majority of patients, however, required from three to five irrigations, 83 per cent of the cures receiving a number within these limits.

There are very definite reasons for the percentage of cures being relatively so low. Since most of the patients were charity cases in a county institution, the relief of symptoms, to them, is synonymous with a cure, and they therefore discontinue treatment too soon. Some refused further treatment on account of the colicky pains sometimes produced by ureteral catheterization.

The fact that relief of symptoms does not always denote a cure has been demonstrated to us many times by patients who, having left the hospital symptomless but with urines positive for the infecting organism, return within the year following with the same or similar symptoms, and with the bacterial findings found on the first examination. They have had no symptoms from one to several months following their first symptomatic relief. It is logical to assume that during the symptomless period the infection, though still present, was inactive. These patients may justly be considered carriers in the sense that they have infectious foci, potentially dangerous to themselves. In such cases any factor that tends to reduce general or local resistance permits increased bacterial activity manifested by symptoms. It is important, therefore, to insist on treatment until all infection is eradicated. To be practically certain that such a condition is present, the writers believe that two sterile urines from ureteral catheters one week apart suffice, since there have been no recurrences in the patients so handled thus far, and some have been discharged for over a year. Patients are often examined whose urines are sterile for a period of one week, but yield a positive culture the week following from one or both kidneys. When the urine, however, remains sterile for two successive weeks, the kidneys are likely to be entirely free from bacteria.

The determination of cure in these cases is not altogether unlike that required for the cure of the carrier state in cases of typhoid fever, wherein it is believed that two successive negative cultures from stool and urine are sufficient to indicate that the individual is free from typhoid bacilli. One of the patients of this series had been a urinary typhoid carrier since an attack of typhoid fever six months before. Her focus was found to be in the pelvis of the right kidney, which disappeared at once with three pelvic irrigations. She had been under observation and medical treatment for six months previously, with no apparent change in her carrier state. She has remained bacilli-free for the last four months.

It is a well-known fact that passage of a ureteral catheter will in some instances produce a marked alleviation or complete subsidence of symptoms. This observation has influenced some to believe that the entire benefit obtained after pelvic lavage is due to the drainage established by the ureteral catheter. Undoubtedly there are many patients whose symptoms have been produced almost entirely by inflammatory obstruction along the ureter, and it is not unusual under these conditions for the symptoms to be relieved by drainage established by the passage of a ureteral catheter. The writers cannot conclude, however, that the result is a bacteriologic cure, as numerous occasions have presented themselves to test this point bacteriologically, and invariably the patients relieved by the catheter still have infected urines after a complete disappearance of symptoms. The danger of forcing infectious material into the secreting papillæ of the kidney, while anatomically possible under sufficient pressure, is highly improbable when lavage is carefully performed. Therefore it would seem wise to perform lavage on all occasions in which drainage by means of ureteral catheter is indicated, thereby getting the advantages of both drainage and the beneficial local action of the medicament. Although the medicament does not come in contact with all of the infecting microörganisms, its action on the inflammatory tissues undoubtedly increases the bactericidal activity of such tissue. The mechanical effect of irrigation may act beneficially in certain instances when suppuration is profuse.

It is now generally agreed that the coccus forms, especially the staphylococcus, have a tendency to infect the parenchymatous

rather than the renal pelvic tissue. The infecting cocci and the resultant lesions are therefore usually somewhat distant from the renal pelvis and calyces, and anatomically not accessible to renal pelvic medication; on the other hand, the colon group infections being of the pelvis, calyces, and the immediately adjacent parenchyma, should be the type more suitable for this method of treatment. This bacteriologic and pathologic observation is confirmed by the results in the treatment of these infections. Twenty-seven, or 90 per cent, of all the cures were in infections by the colon bacillus group, and only three, or 10 per cent, were coccus infections. Though many more patients were treated for colon bacillus infection than for coccus infection, the percentage of bacteriologic cures is markedly lower for the coccus infection than the bacillus infection. Five patients with staphylococcus infection were treated for months with the foregoing internal and local treatment, with only temporary or quantitative improvement bacteriologically.

RESULTS IN TREATMENT OF PARESIS BY INUNCTION OF MERCURY AND DRAINAGE OF THE CEREBROSPINAL FLUID.

In the *American Journal of Insanity* for April, 1918, FINLAYSON states that the Swift-Ellis form of salvarsan medication was tried at the State Hospital for the Insane, Warren, Pa., for two years following its first presentation in the literature, and the indifferent results obtained did not justify its continuation. These results corroborated the opinion expressed by Sachs and many others that whatever benefit was obtained came from the intravenous administration of the drug. Further proof of this has been given in Massachusetts, where salvarsan or allied products have been used only intravenously.

When Gilpin and Early presented in 1915 the favorable results of their investigation with inunctions of mercury and drainage of the spinal fluid, the procedure appealed to the writer as opening a field for further investigation which might possibly furnish a method of treating paresis which could be used by the average practitioner with a minimum of danger and at an expense that would not be prohibitive to any one.

To carry out this idea a certain number of paretics who were available for treatment were selected, and other cases were added later as admitted. The investigation covered by this report extended over a period of fifteen months, although all of the patients were not under treatment during the entire time. In all, 20 patients were treated. Fourteen of these were selected for this report; the others were not used because the patients were discharged from the hospital or died less than four months after treatment was begun, and it seemed that this period was a minimum length of time on which to make observations.

The method pursued was similar to that of Gilpin and Early, but differed in this respect, that the patients were given daily inunctions of mercurial ointment 50 per cent, beginning with a drachm and gradually advancing to three drachms. The surface of the body was divided into eight areas, and the different areas used consecutively so as to avoid an unnecessary dermatitis in those susceptible. In this way any given area was used only once in eight days. When the amount of mercurial ointment used reached three drachms daily considerable difficulty was experienced in making the skin absorb it. To overcome this two areas instead of one were used each day. One patient reacted with such violent dermatitis that the treatment had to be abandoned for several months. Later, no such reaction occurred, and the treatment was resumed.

The spinal fluid was withdrawn at approximately ten-day intervals. From 20 Cc. to 50 Cc. was withdrawn, the amount depending on the pressure and rapidity of the flow. The first 5 Cc. was reserved for serological examination and the remainder for chemical tests for the presence of mercury. Most of the lumbar punctures were done with the patient sitting on a chair with the elbows on the knees and the back

bowed out. The site of the puncture was the space between the second and the third lumbar vertebræ and the area was prepared by disinfecting with seven-per-cent tincture of iodine. The needle was boiled, cooled in alcohol, and thoroughly rinsed with distilled water. The routine observations were: On the blood, the Wassermann reaction; on the spinal fluid, a Wassermann reaction, globulin test, cell count, and colloidal gold reaction. The spinal fluid used for the cell count was the first withdrawn, and was diluted at once in a red-cell pipette 1-100 with acetic acid tinted with methyl violet and thoroughly shaken. In the Wassermann tests on the blood and spinal fluid the technique observed was that reported in detail by Weston. When the term positive is used, ++++ is meant. In testing the spinal fluid for mercury, only minute amounts were expected, so that the spinal fluids of all patients were grouped to the amount of 500 Cc. and this tested. The method of Vegel and Lee was used to determine the presence of mercury.

Fourteen paretics, who had been showing symptoms from nine months to several years, received daily inunctions of mercurial ointment 50 per cent. Every tenth day a lumbar puncture was made and from 20 Cc. to 40 Cc. of fluid withdrawn, the amount depending on the pressure and the rapidity of the flow. A Wassermann reaction was done, using the blood serum; a globulin test, cell count, Lange's colloidal gold test, Wassermann reaction, and a chemical test to determine the presence of mercury were done, using the fluid. In seven, or 50 per cent of the cases, the blood Wassermann became negative and remained so for varying periods of time; one case had a negative blood at the time of admission, and it remained so throughout the period of observation. In six, or 43 per cent of the cases, the spinal fluid became negative and remained so for varying periods of time. In no instance did the blood or spinal fluid become negative and remain so. All cases had negative globulin tests at one or more examinations, but, with the exception of one case, more positives than negatives were obtained. The cell count showed an irregular decrease in all instances. In four, or 28 per cent of the cases, the colloidal gold became negative—that is, was neither paretic nor luetic in type—but all showed "paretic curves" at some later examination. After 15 months' treatment a trace of mercury was found in 500 Cc. of grouped spinal fluids. No mercury was found on previous examinations.

One case showed a good remission mentally, but all the serological findings remained strongly positive. Another case did not improve quite as much, but approached a state termed a remission, and has shown some negative serological findings. The remaining 12 cases showed no greater mental or physical changes than would be found in a similar group of untreated cases. The lack of correlation between the serological findings and the mental conditions leaves little ground on which to base definite conclusions as to the value of the treatment.

VACCINE THERAPY IN CHRONIC INTESTINAL TOXEMIA.

In the *New York Medical Journal* of May 25, 1918, SATTERLEE states that the predominating factor in the symptomatology of chronic intestinal toxemia is the colon bacillus.

In diseased conditions of the colon, the colon bacillus may become very harmful to the human organism by forming and liberating toxins, thus causing a toxemia.

This toxemia gives a definite symptomatology called chronic intestinal toxemia.

Putrefactive organisms often play an important part in intestinal toxemia, but the lasting effects are due to the colon bacillus.

In the study and treatment of all long-standing or severe chronic intestinal toxemias, autogenous colon vaccines should be administered in proper doses.

Autogenous colon vaccines are helpful in the diagnosis of chronic intestinal toxemia.

The method of action of the colon bacillus vaccine is probably an immunization and sensitization of the body cells.

INTRASPINOUS SALVARSAN.

Discussing this subject in the *Virginia Medical Monthly* for May, 1918, TUCKER points out that salvarsan intravenously is very efficient in those cases of superficial involvement of the nervous system, manifested by headache, slight grades of cranial nerve palsy, and luetic vascular conditions. In one of Tucker's cases with intense headache and decided mental confusion the Wassermann was rendered negative and the cell count reduced from 160 to 12 by eight treatments. Regarding the intraspinal treatment of syphilis of the central nervous system in its resistant forms, those formerly called metasyphilis, Tucker feels that when the intraspinal method is systematically and judiciously employed it offers far more in the way of therapeutic possibilities than the use of mercury, or salvarsan intravenously. No matter what the clinical improvement has been, unless we can eradicate the biological evidences of the infection we have not completed our work and destruction is taking place.

Tucker feels that mercury and iodide should be included in the medication of syphilis of the central nervous system. Properly regulated rest and remedial and precision exercises should also be given the ataxic cases.

He uses Ogilvie's method, which is briefly as follows:

Old salvarsan, that is arsenobenzol, is used. Fifty Cc. of blood is drawn into sterile centrifuge tubes by means of an ordinary deep-injection needle. This fluid is at once centrifuged until all fibrin and cellular elements are thrown down. This takes about fifteen minutes at 2000 revolutions a minute. With a sterile pipette 10 or 12 Cc. of serum is taken. The salvarsan solution is mixed in proportion of 1 gm. to 40 Cc. of freshly distilled boiled water, care being taken not to overneutralize the solution. From this solution .1 to .2 Cc. is measured in a 1-Cc. tube graduated tenths and then mixed thoroughly with the serum. The serum is then inactivated at 56° C. for forty-five minutes. After cooling to body temperature, it is ready for administration.

The patient is put on either side near the edge of the bed with his knees flexed on the thighs, and the thighs on the abdomen, and the head and shoulders flexed as much as possible. A lumbar puncture is then done, using a Quincke needle, the syringe connected with the needle, and the serum allowed to run in by gravity or with very gentle pressure on the piston.

Tucker does not use the large doses recommended by some authors. He never uses more than .5 mg., and preferably not over .3 mg., believing small doses at more frequent intervals bring the best results. Nothing is to be gained by massive doses, and the possibility of injuring nerve tissue is reduced to the minimum when small doses are used. The serum should be used immediately, or certainly not later than three hours after its withdrawal. He does not withdraw any spinal fluid unless it is under considerable pressure, for, theoretically at least, increased intradural pressure helps the serum to penetrate more deeply into the nerve tissue. The patient is kept in bed without pillows and with the foot of the bed elevated. After twenty-four to thirty-six hours he is allowed to go home.

As to the number of treatments in any given case Tucker is guided entirely by the laboratory examinations. He treats them until the Wassermann is negative and the cell count and globulin are normal. Some cases respond to treatment much quicker than others. Every case should be watched after an apparent cure. A Wassermann, globulin estimation and cell count should be done several times a year for a number of years. A slight fixation of the Wassermann, increased globulin reaction or an increase in cells, indicates further treatment. It should be borne in mind that many cases giving a negative blood Wassermann give a positive spinal fluid Wassermann.

In concluding his paper Tucker says he

1. Believes intraspinal salvarsan to be without danger, provided small doses are given and perfect asepsis used.

2. Each individual case should be treated until the Wassermann is negative and the globulin and cell count normal.

3. Frequent examinations of the spinal fluid should be done after an apparent cure and treatment again instituted if necessary, as shown by the Wassermann, cell count and globulin estimation.

4. Intraspinal salvarsan in most cases effects a great clinical improvement and not infrequently also eradicates the biological evidence of active syphilis.

5. Advanced cases of paresis are rarely benefited by any method of treatment.

6. In cases of syphilis of the central nervous system, intraspinal treatment properly given is far more efficacious than intravenous.

7. Intravenous treatment is chiefly beneficial in those cases of disease of the central nervous system which give a positive blood Wassermann as well as spinal fluid Wassermann, but in many cases it is advisable to give the drug not only intraspinally but intravenously.

A STUDY OF A GROUP OF PROSTITUTES.

After a sociological, neurological, serological, and psychiatrical study of a group of prostitutes, the results of which BALL and THOMAS publish in the *American Journal of Insanity* for April 1, 1918, they make the following statements:

Looking back over their work of a year and a half, however, they find no little difficulty in stating their impressions of the social problem of prostitution. The work extending over such a period of time, and visiting such a large number of houses, tended to wipe out all preconceived theories and notions about the subject. All these theories and notions in the popular mind arise from lack of knowledge and the hysterical and misleading statements sent out by well-meaning, but misinformed, enthusiasts, who by edict would make the world over in a night.

It particularly strikes the writers that everywhere the laws are directed against the woman. Granted that the women are unchaste, fallen, and undesirable in a community; it is the men who seek them out, and this is true in the proportion of easily 20 to 1, as not only their figures but the statistics of others demonstrate. Also it is a fact that at least one-half of the visitors are married men.

If the problem of prostitution is to be attacked, something more will have to be done than chasing or shooing these unfortunates from pillar to post.

If one observes the streets and alleys by night and sees the army of men trailing up and down, in and out, as at a fair, it would illuminate the subject a little more.

The observations made inside the houses would also change your notions. The sight is pitiable, for usually it means young girls from homes of no training, of no innate strength of character, of little or no education, giving history of poor, often extremely bad, environmental conditions, of poor heredity, bad associates, the majority testing subnormal, many being defective and feeble-minded and manifesting few or no special abilities, but many disabilities.

Especially educated, gifted, witty and sparkling prostitutes it has not been their fortune to meet. One reads of them, but seldom are they seen in houses of prostitution. They may be "kept women," and we hear of them in divorce and probate courts. The writers found no places where girls were kept against their wills, as most of the houses they visited were the so-called "cribs," nobody living in them except the "madame," the girls all having lodgings elsewhere and coming to work at certain hours and working under assumed names.

The term "white slave" is a very flexible one, and in the public mind is synonymous with all that is associated with prostitution. Certainly, in San Francisco, the police have kept pandering to a minimum, and unwilling detention in a house of prostitution is unknown, certainly, as a practice. No woman ever enters this life at the point of a pistol. The prostitute's life is usually deciphered, and the writers find the following picture the usual one: "Sexual experience" (sometimes numerous) preceding the actual "turning out;" "the decision to offer her

body to indiscriminate intercourse with men for hire;" "the gratification of her ambition;" "the entering a house of prostitution and becoming a part of the 'system.'" These women are the ones who in the shuffle of life dropped into their respective places as the various-sized oranges or pieces of crushed rock dropped through the apertures in a grader into their respective receptacles.

Their equipment is not sufficient to enable them to cope with any environment in a normal manner.

This is not alone a sociological problem but a psychological problem as well, and the studies of causes should begin in the cradle—the individual, male and female, should be studied, and those having special abilities should have them developed; those manifesting early bad sex habits should be guarded, and if defective should become institutional cases.

The plea is therefore for closer studies of schoolchildren, and the establishment by either public or private funds of psychopathic laboratories for this work. Only by these means can this great problem be, even partly, solved.

REPORT ON ARSPHENAMIN.

As a result of employing dioxidiamidoarsenobenzol made in this country in a great number of cases MEDDIS and STERLING (*Journal of the American Medical Association,* May 18, 1918) reach the following conclusions:

1. The arsenobenzol brand of arsphenamin made in this country is in the experience of the writers non-toxic, and equally as efficient therapeutically as the original Ehrlich preparation.

2. It may be used in concentrated solution with no ill effects.

3. Adrenalin, given in a 1:1000 solution ten minutes before the injection, will control reaction.

4. The only reaction noted in this series of cases was slight headache; in some cases diarrhea and slight malaise were noted.

5. In phagedenic chancroids, "arsenobenzol" has a very beneficial effect, and is recommended where the healing is slow and response to other treatment is poor.

THE PLACE OF OPIUM IN THE THERAPEUTICS OF INFANCY AND CHILDHOOD.

GRIFFITH in the *Pennsylvania Medical Journal* for May, 1918, contributes an interesting paper on this topic. He thinks that the reaction from the too frequent use of opium in the presence of diarrhea in children still persists, to what seems to Griffith an unwarrantable extent. It is undoubtedly true that it is not required in the majority of cases and is capable of doing much damage, and that our principal treatment should be dietetic and hygienic. There is no disorder in which a more careful discrimination is necessary. In all cases of acute diarrhea in which there are symptoms indicating autointoxication of some degree, it is entirely inadmissible. When, for instance, there still exists vomiting, high fever, nervous symptoms, foul evacuations, and distention of the abdomen the effort should be made to empty the bowels, and to prevent food of an improper nature from entering them.

On the other hand after all danger of intoxication is apparently over, it not infrequently happens that numerous large, liquid movements persist and are a distinct element of danger through the loss of liquid from the economy. Under such circumstances opiates will do good by quieting the too active intestinal peristalsis, and they should certainly be used. It is necessary to give the drug in sufficiently large doses, but not too near together and not large enough to narcotize the patient. When the condition is urgent it should be given hypodermically in the form of morphine. Griffith has seen four drops of paregoric narcotize a four-months-old infant. This susceptibility is, however, not a contraindication, but only a cause for the employment of care. For the frequent movements of

ileocolitis, accompanied by pain and straining, opium is distinctly needed, and should be given regardless of the presence of fever; which is not due in this disease to any autointoxication.

PRESENT-DAY OUTLOOK ON TUBERCULOSIS.

Writing in the *Edinburgh Medical Journal* for May, 1918, PHILIP in turning to the treatment of tuberculosis thinks the prospect is full of hope. The fact is realized that no disease is more tractable than tuberculosis, if its character be recognized sufficiently early.

Nature herself cures tuberculosis every day. Half of the people to-day are cases of arrested tubercle. The return of medicine to Nature's methods of cure is a story of deep human interest.

If the disease be taken in hand early, tuberculosis is readily managed. The principles of treatment are well defined. Their successful application requires not only knowledge and skill, but complete reliance on the methods and infinite patience—patience on the doctor's part, patience on the sick man's part, and patience on the part of the patient's friends, the inevitable friends who think they know better than both.

By the recognition of the eternal principle of aerotherapy and by fulfilment of physiological demands for rest, movement, and feeding, the treatment of tuberculosis has been revolutionized. The parasitic invader has been countered by Nature's own methods. Disease has been scared from a soil rendered unsuitable.

For many years some of us have pleaded for the more general realization of aerotherapy in the treatment not only of tuberculosis, but of disease generally. There is still a pathetic, tragic failure to appreciate the value in household and in hospital of this great cleansing, antidotal, and vitalizing principle.

Thanks to the devoted labors for many years of dispensary officers and tuberculosis nurses in Edinburgh—particularly in the poorer parts—this city has justly acquired the reputation of being one of the most open-windowed cities. Yet paradoxes meet us at every turn. One of the most striking is the relative infrequency of the open window in large houses and in halls of learning and other places where men and women congregate, and in institutions for the treatment of disease. Philip's conviction is complete as to the view expressed by him many years ago that in the adaptation of aerotherapy to the prevention and treatment of disease, there exists the potential of success comparable with those obtaining in surgery through the practice of aseptic methods. The principle of aerotherapy is the foundation of child welfare.

One of the difficulties we were up against in the early days was the mistaken view that consumption, as it was then called, was a disease of climate. Our forebears looked on consumption largely as one of the scourges of our climate. With little inquiry as to its frequency elsewhere, it was assumed to be dependent on the uncongenial elements, the gray sky, and the east wind. The opinion was voiced by the man in the street, by our writers, and by our poets. It was expressed with painful bluntness by a distinguished citizen of Edinburgh, to whom Philip went in the hope of enlisting his powerful backing at the commencement of the committee's work. "I'll gladly," he said, "contribute all I can to send every poor consumptive soul away from Edinburgh, but you'll never convince me you can do any good to them here."

We are happily removed from those days in thought and practice. There is now general recognition of the fact that, as tuberculosis occurs everywhere, in like manner it may be cured anywhere.

Assuming that the larger physiological requirements have been met, can we direct treatment more intimately? Can we attack the tubercle bacillus within the system more directly? Is there a specific treatment?

This brings us to the possibilities of vaccine therapy and chemotherapy.

Vaccine therapy is represented by the numerous attempts to meet the disease by the use of products of the life-history of the bacillus as a means of cure. Many such products have been elaborated. Entire tubercle bacilli variously treated have been used, or the bacilli finely ground and emulsified. Extracts have been made from bacilli themselves and from the culture media in which bacilli have been grown. Such preparations constitute the considerable group of tuberculins available for treatment.

What is the purpose and value of tuberculin therapy? Its aim is to stimulate the natural protective mechanism in the hope of attaining some degree of immunity. It seeks to activate the phagocyte and the parasitotropic elements of the blood. In this way local and systemic effects are induced, which are severally contributory to the therapeutic result.

So far it has been found impossible certainly to immunize an animal against tuberculosis, and no less difficult to secure permanent arrest of the disease in an infected animal. None the less there is evidence, both from the experimental and from the clinical side, that tuberculin therapy is efficacious. Philip is satisfied, as the result of continued observation since it was introduced, that tuberculin is of specific value. Some points relating to its use still require to be made clear. But the amount of evidence accumulated during these years leaves Philip in no doubt as to the favorable verdict.

The remarkable success attained in the treatment of infections by means of organic arsenic compounds makes one hopefully anticipate similar developments from chemotherapy in the treatment of tuberculosis.

The aim of chemotherapy is the discovery of chemical substances possessed of parasitotropic properties—that is, capable of disturbing or destroying the invading parasite. The difficulty in the past has been that, for the most part, parasitotropic substances are also organotropic—that is, inimical to the living cells of the invaded body. The method of chemotherapy is illustrated by the use of arsenic in various diseases due to parasitic invasion, such as syphilis, trypanosomiasis, relapsing fever, and malaria.

There is no doubt that even in simple form arsenic is a drug of value in the treatment of the earliest manifestations of tuberculosis. When treatment by arsenic—whether orally or subcutaneously—is undertaken at the stage of multiple infiltration of lymphatic glands and maintained continuously for a prolonged period, remarkable results are sometimes obtained.

There is ground for believing that from the further development of chemotherapeutic experiment we are likely to obtain results in the treatment of tuberculosis comparable with our success in syphilis. There are many common features in the history of the two diseases from the point of inoculation through the lymphatic stage to the final visceral stage. It cannot be too much emphasized, however, that if tuberculosis is to be cured, treatment must be undertaken at the earliest possible moment. Following the analogy of syphilitic infection, it is relatively easy to effect a cure, provided treatment on proper lines be adopted at the stage of primary lesion or early secondary manifestations. It is another matter when gross organic disturbance has ensued, or extensive histological changes have been produced.

TETANUS FOLLOWING INTRAMUSCULAR INJECTION OF QUININE.

Apropos of several reports to which we have called attention, in times past, the *British Medical Journal* of April 27, 1918, contains a note on this subject and states that the following report records a sequence of events which has, we believe, very rarely been observed:

Pte. B., aged twenty-four, who was suffering from malaria contracted in Macedonia, received an intramuscular injection of quinine on March 8, 1918. On March 19 he complained of stiff jaws, and later on of stiff neck. A subcutaneous injection of

8000 units of antitetanic serum was given. On the morning of March 20 he had frequent tetanic spasms. At 10 A.M. on that day he received 8000 units of antitetanic serum intramuscularly and 15,000 units intrathecally, followed by 16,000 units intravenously. He died from general tetanus at 5.30 P.M. on the same day.

A post-mortem examination was made. A saline emulsion of the muscle from the site of the quinine injection failed to induce tetanus in a guinea-pig inoculated with it, but a second guinea-pig, inoculated with a muscle extract of the first animal, developed true tetanus within twenty-four hours. The bacteriologist recovered the tetanus bacillus from the muscles at the site of inoculation in both guinea-pigs, while from the muscle of the patient only a few bacilli were cultivated which morphologically resembled the tetanus bacillus.

In this connection the following communication by Murray to the *Indian Medical Gazette* for March, 1918, is of interest:

"In an article which appeared in the December number of the *Indian Medical Gazette*, Major MacGilchrist condemns the treatment of malaria by the intramuscular injection of *strong* solutions of the more soluble quinine salts. It may therefore be worth while recording that this method has been extensively used in Port Blair for many years with excellent results. During the past twelve months about 4000 such injections (usually 15 grains of quinine bihydrochloride in about 20 minims of water) have been given, and medical officers in India are unanimously convinced of the great value of this form of treatment in cases of pernicious malaria, or in those which do not respond readily to or are unsuitable for oral administration. Necrosis or abscess at the site of injection is infrequent and can be traced to careless technique. One medical officer who has personally given many hundreds of such injections to both Indian and European patients during the last eleven years has never had an injection abscess in his practice. Tetanus following injection is unknown. Practical experience on a large scale has therefore proved the efficacy and harmlessness of this form of treatment in these islands."

PETROL DERMATITIS.

In the *Practitioner* for May, 1918, PAGE calls attention to this condition. So far as he is aware the condition of petrol dermatitis has not been described before in the medical press, although it must be familiar to many who have been attached to the Air Services. During nearly two years with the Royal Naval Air Service in Flanders, Page saw a number of cases, and as he has been asked on several occasions recently for suggestions regarding treatment, the following notes may prove useful.

The condition is due to the more or less prolonged contact of petrol-soaked clothing with the skin, and is a fairly frequent concomitant of aeroplane crashes. The occupants may be pinned by wreckage beneath a burst tank, and, after being extricated, they may be too dazed or hurt to remove their flying gear so as to allow the petrol to escape. Inexperienced pilots, though otherwise unhurt, may delay changing their clothes, until the burning pain warns them that something is wrong. Less frequently the condition is brought about during an ordinary flight by leaking tanks or connections, and Page has seen two cases which were not related to aviation.

The lesion produced resembles exactly a burn or scald of the first and second degree; that is to say, there is erythema and some vesication with a considerable amount of burning pain. The area involved is often large—*e.g.*, both legs, thighs, and feet.

As regards treatment, it is worth while noting that grease of any sort increases the discomfort. Lead lotion applied on lint or zinc-carbolic lotion (zinc oxide drs. 3, suspended in glycerin, oz. 1, in 1-per-cent carbolic acid solution to oz. 8) sponged on are the best applications at first. These may be followed by a simple dusting powder when the symptoms subside, a process which is fortunately rapid. The affected

limbs should be left uncovered in warm weather, or else a cradle used to support the bedclothes.

As it may be the duty of any practitioner to attend an aeroplane accident, Page emphasizes the importance of noting whether the patient's clothing is saturated with petrol, and if it is, of removing it as soon as circumstances permit.

Page reminds his readers, unacquainted with aviation, that the débris in an aeroplane crash, together with the surrounding ground, is covered with petrol as a rule, and that it is the duty of those rendering aid to see that naked lights and smoking in the vicinity are forbidden.

It will be seen that petrol dermatitis is a very painful but not a serious condition, and that it may prove a troublesome complication when injuries demanding tranquillity on the part of the patient are present.

THE APPLICATION OF ANAPHYLACTIC SKIN TESTS TO GENERAL MEDICINE.

AYRES in the *Boston Medical and Surgical Journal* of May 23, 1918, states that the technique of the cutaneous tests is extremely simple. The powdered protein extracts may be obtained in ampoules from several pharmaceutical houses. The following is the procedure used:

1. Wash the flexor surface of the forearm from the bend of the elbow to the wrist and rinse with 70-per-cent alcohol.

2. Dry with sterile gauze.

3. Using a two-tenths-per-cent solution of KOH as a diluent, place one drop just below the bend of the elbow. Distal to this, place three drops across the forearm, each drop equally spaced. Cover the remainder of the forearm with similar three-drop rows, stopping just before reaching the tendinous part of the wrist.

4. With a sharp scalpel make an incision above five-tenths of a centimeter long, through the drop into the skin, but not deep enough to draw blood.

5. Immediately place a small bit of the powdered protein on the end of the knife blade, and mix it thoroughly with the drop of KOH. Perform a similar operation with the remaining drops, using a different protein with each one.

6. The first drop just below the bend of the elbow is used as a control, the incision being made, but no protein added. The location of the control drop may be varied, but this region has been found to be particularly sensitive, so that if there is any tendency to a false positive reaction, it can be easily detected with the control in the most sensitive area.

Usually there is a slight transient nonspecific wheal formation, due to trauma, but this can be ruled out because it occurs in the control as well. It lasts a variable time and may disappear.

The true reaction occurs from two to twenty minutes or longer after the protein has been applied. Usually the reading is taken fifteen minutes after the last incision has been made. Dr. Turnbull regards a reaction as positive when there is a wheal, an erythema, or a combination of the two, with a total narrow diameter of three millimeters, or more, appearing at the site of some of the incisions, but absent in the control incision. A reaction less than this should be regarded as negative or questionable. Some reactions may be very intense and involve a large area.

Practically all of the proteins with which an individual is likely to come into contact are obtainable on the market in a purified state. Thus we have the food proteins, such as beef, pork, chicken, lobster, strawberry, banana, wheat, rye, etc.; different bacterials proteins, pollen proteins, and inhaled animal proteins, such as horse, dog, or cat dandruff or hair, etc. It is not necessary to try out the whole list on every individual; the indications in each case should determine the procedure.

What is the practical bearing of all this? Suppose a patient comes to your office complaining of a chronic urticaria and constipation, and with no definite idea as to etiology. Is your treatment going to be rational or irrational; is it going to be

scientific or of old-fashioned hit-or-miss variety?

Is one going to give him salol or betanaphthol as an intestinal antiseptic, calcium lactate for a hypothetical deficiency of calcium in his blood, and tell him to stop eating all meats? Or is one going to determine in a very simple manner by skin reactions to what protein he is sensitive and regulate his diet according to definite indications, beginning, of course, with a thorough catharsis?

According to the first line of treatment there are three objections. In the first place, the efficacy of intestinal antiseptics is a matter of considerable debate, but, granting their value, they can never result in permanent cure or so long as anaphylactic proteins are being ingested or inhaled. In the second place, the evidence in favor of calcium deficiency in urticaria is balanced or even outweighed by evidence to the contrary. However, some very capable men claim satisfactory results from the use of calcium, and it is possible that some urticarias and angioneurotic edemas may be due to a disturbance of calcium in the blood, brought on or aggravated by such decalcifying agents as fruit acids. This is open to question.

In the third place, and most important of all, the prescription of a diet should be as carefully considered and as intelligently ordered as the prescription for any drug. What good is it going to do our patient when we tell him to cut out all meats and fish and raw fruits, if his symptoms are due to the wheat or rye in his bread, or the casein in his milk? Cooke emphasizes the fact that over 50 per cent of sensitized people show multiple sensitization. Our patient may be sensitive to beef, eggs, shrimp, wheat, casein, and beans. How is it going to benefit him, then, if we order him to eliminate from his dietary all meats, or all fruits, or all vegetables? Diet is an individual problem, and we should endeavor to make the food fit the patient, instead of trying to make the patient fit the food.

In other words, the aim in treating any disease should be to improve the underlying cause; with this in mind, drugs are useful as adjuvants. The cutaneous anaphylactic reactions offer a means for determining the underlying cause of disease in a large number of conditions.

THE PNEUMOCOCCIDAL POWER OF RABBIT SERUM AFTER THE ADMINISTRATION OF ETHYLHYDROCUPREIN HYDROCHLORIDE, QUININE AND UREA HYDROCHLORIDE AND OTHER CINCHONA DERIVATIVES.

WEISS in the *Journal of Infectious Diseases* for June, 1918, as the result of a research on this subject states that no pneumococcidal action of rabbit serum could be demonstrated after a single large tolerated dose, after a single fatal dose, after repeated injections of tolerated doses either by oral or by intravenous routes of various derivatives of cinchona, including ethylhydrocuprein hydrochloride, quinine and urea hydrochloride, quinine dihydrobromide, and quinine chlorohydrosulphate.

A review of the literature indicates that the liver of the rabbit has a high destructive action on quinine alkaloids and that both leucocytes and red blood cells (but not serum) have a marked affinity for cinchona compounds.

THE RESULTS FROM TREATMENT OF BACILLARY DYSENTERIES BY SERUM AND BY SALINES RESPECTIVELY.

DOBRASHIAN in the *Journal of the Royal Army Medical Corps* for April, 1918, makes a report on this important topic.

The serum used was in the majority of cases a polyvalent one. A few cases of Shiga dysentery in garrison troops were treated by Dr. B. M. Cunningham with Shiga antidysenteric serum (Pasteur Institute) supplied through the kindness of Major W. Broughton-Alcock. Serum was at times given alone following a single dose of some aperient medicine, at other times in combination with salines administered

more or less frequently. The smallest single dose was ten cubic centimeters—this patient (Flexner dysentery) received such a dose on the sixth and eighth days of his illness with but little benefit, followed by twenty cubic centimeters on the tenth day. Convalescence was slow, the man not being fit for convalescent camp until the end of the fourteenth week.

Another case received ten cubic centimeters on the tenth, eleventh, and thirteenth days of illness; he developed severe serum sickness on the twenty-third day, followed by persistent tachycardia, but was transferred to the "heart clinic" of a convalescent camp at the end of fourteen weeks.

Several severe toxic cases received 100 cubic centimeters or more at one dose; one such case coming under treatment on the fourth day of illness was given 115 cubic centimeters of serum on the fifth day and 120 cubic centimeters on the sixth day. Convalescence was rapid, and the patient was transferred to camp at the end of eight weeks. The largest total amount of serum given to any one patient was 420 cubic centimeters. Treatment was not commenced until the seventh day; from then onward to the twentieth this man received doses varying from 100 to 120 cubic centimeters. He was transferred to camp at the end of eleven weeks. Another patient received between the sixth and thirteenth days a total of 340 cubic centimeters of serum together with intravenous salines and drachm doses of sodium sulphate by the mouth. He went to camp at the end of eight weeks. It is interesting to note that in both these cases serum sickness was mild.

From a study of the case-sheets of patients treated by serum it would appear that the best results are obtained where serum has been given in fairly large doses (forty to sixty cubic centimeters of polyvalent serum) and on consecutive days, salines being administered simultaneously by the mouth. The following examples serve to illustrate this point and its converse.

When a patient was treated "with salines only" this term meant varying dosage and intervals, and largely depended on the severity of the case. Some medical officers would prescribe sodium (or magnesium) sulphate in drachm or half-drachm doses every hour for six, twelve, or even twenty-four doses; others every two hours for twenty-four hours, followed by less frequent doses. Other cases would receive these doses only every four hours, and occasionally a mild case would be ordered salines only three times daily.

It would be very difficult to obtain a parallel series of cases of equal severity and treated uniformly, on the one hand with serum combined with salines, and on the other hand with salines only. Such an achievement could alone give strictly comparable results. Had it been possible to have included in this report every case of dysentery which passed through the hospital the results as obtained from *all* cases treated with serum would have still been by far and away the best, though at the same time the results from *all* cases treated with salines would have been better than in the present series of cases.

In spite of the severe type of case which was treated with serum, the results have been shown to be vastly superior to those which received salines only. All the figures, however, bring out the importance of early serum treatment. It should be noticed that no fatal case occurred amongst patients treated before the end of the first week. Even in Shiga dysentery eighty-eight per cent of cases treated from the second day and seventy per cent of those treated from the third day of illness made a rapid recovery, nor was there from amongst these cases a single one which had to be invalided home or which did not finally make a complete recovery. Even of those treated on or before the fifth day there were only nine per cent whose convalescence could in any way have been termed unsatisfactory.

Moreover, as a preventive of certain complications and sequelæ, serum holds a most important position. For example, it has been shown that not a single case of dysenteric arthritis occurred among patients who

were treated on or before the fifth day of illness, and though data are necessarily incomplete, carrier cases would appear to be of far less frequent occurrence when serum has been used. Further, in spite of the toxic condition of so many of the patients when they first came under observation, only six per cent of those treated on or before the fifth day developed cardiac dilatation or persistent tachycardia. Not only was convalescence rapid when serum was given early, and repeated in adequate doses, but relapses were very rare, so that a more rapid evacuation of patients to convalescent camps was possible than in the case of those treated with salines only. The average duration of hospital treatment for the two classes of cases was found to be 8.6 and 9.6 respectively.

It is therefore urged that there should be:

1. A more extensive use of antidysenteric serum which should be *given at the earliest opportunity.*

2. *That doses should be adequate;* by that the writer means at least 40 cubic centimeters of polyvalent serum, for a case of moderate severity.

3. That two, three, or even four such doses should be given *on consecutive days.*

4. That *at the same time salines by the mouth* should be administered frequently, drachm or half-drachm doses every hour or two hours until the stools become fecal, and thereafter in gradually diminishing doses.

RESULTS FROM THE INTRAVENOUS USE OF SALVARSAN IN SYPHILIS OF THE CENTRAL NERVOUS SYSTEM.

The *New York Medical Journal* of June 1, 1918, reports the remarks made by SACHS before the recent meeting of the Association of American Physicians. He said that at this critical period of the national life it was important to consider the treatment of a disease which so often maims and so rarely kills. His paper was based on results of analyses of 400 cases at Mt. Sinai Hospital treated intravenously with the Philadelphia preparation of arsphenamin, which had proved entirely satisfactory. The views of Sachs upon the superiority of the intravenous method have been opposed by Fordyce, who has stated that "if the views of Sachs are final, an enormous amount of harm will result, as many victims of syphilis of the central nervous system will be deprived of their hope of recovery." Sachs said he felt convinced that much more good would be accomplished by the intravenous treatment, which could be said to be safe in the hands of the majority of physicians. All biological tests should be used as corroborative evidence, and clinical evidence should not be disregarded. It could be said that the lack of serological evidence did not always disprove syphilis, nor was there a parallel between clinical symptoms and serological findings, as remissions were often observed without serological change, and serological improvement was not always accompanied by clinical betterment. It was only in types with vascular lesions that the clinical findings and serological tests progressed *pari passu.*

Of general paresis and tabes it could be said that the chief lesions were deep in the brain and cord, far removed from the spinal fluid, and only to be reached by the blood stream. In the meningomyelitic type of involvement it was impossible for the curative substances to remain in the fluid long enough to do any good. The doctrine of the impermeability of the choroid plexus was refuted. The pressure in the cerebral capillaries being higher than in the fluid, a metallic substance like salvarsan was rapidly absorbed into the venous system; therefore, why should not the venous system be used at once? Intraspinous medication, it was stated, was theoretically and essentially unsound. It was fatal to the syphilitic organism, but frequently also to the patient. Early and intensive treatment was essential, as many doses as one every other day for four to six weeks, followed by a period of complete rest, where necessary. Forty or fifty injections might be required within a year. It would be impossible to introduce toxic substances so frequently into the canal.

The advantages of the intravenous method were shown in the improvement of such syphilitic symptoms as headaches, palsies, epilepsies, and vascular symptoms.

The type of case with spastic rigidity, rather than paralysis, showed least improvement from beginning to end. No claim could be made for the cure of tabes dorsalis or general paresis by the intraspinous method; the most that could be said was that remissions might be longer. It had been claimed that the neurologist did not see early cases, but it was precisely the neurologist or the psychiatrist who made the early diagnosis. It was therefore urged that treatment be begun as early as possible, and continued for years, and the patient be kept under medical control as long as necessary.

GALL-STONES.

Weiss in the *New York Medical Journal* of June 1, 1918, gives advice that most surgeons will oppose. He believes that the treatment of biliary colic consists in treatment for relief of the painful paroxysms and treatment of the patient between the attacks. In acute biliary colic the pain is often so agonizing that it will yield to nothing except hypodermic injections of morphine or inhalations of chloroform. Weiss, personally, has discarded morphine as a dangerous and habit-forming drug, and in its stead has employed a tablet of 0.00065 grain of atropine sulphate dissolved under the tongue, followed by fifteen drops of adrenalin chloride solution 1:1000 in a tablespoonful of water. The latter may be repeated once or twice within a short time if necessary; also the local application of menthol, camphor, and methyl salicylate in petrolatum, massaged gently over the seat of pain, covered with gutta-percha to favor absorption, has been invariably followed by relief within twenty to thirty minutes. According to Kraus, antipyrin, if given at the beginning of the attack, has afforded considerable relief. Naunyn has had favorable results with a single dose of salicylate of soda given at the beginning of the attack. Others, including Weiss, have found that copious draughts of warm water gave relief, even though promptly vomited.

The vomiting accompanying the biliary colic hardly requires any special treatment, apart from that of the pain. Bismuth, soda, or dilute hydrocyanic acid may be given. Weiss employs water containing bicarbonate of soda, which relieves purposeless retching by giving the stomach something to bring up. If retching persists, and the patient is in a state of collapse, iced champagne may be given. In less severe cases the patient may be put in a hot bath of 104° F. and given tincture of belladonna, twenty minims in spirits of chloroform, to relieve the spasm. Hot fomentations or poultices, unless contraindicated by cholecystitis, may be tried over the liver and antipyrin given by mouth. If cholecystitis is present, the hot bath is contraindicated and ice-bags are to be applied over the gall-bladder region.

According to the surgeon, an operation will be the best way to relieve or cure the patient. How should such patients be managed with greatest advantage to themselves, when their advisers do not share the surgeon's radical views? This differs mainly with the patient affected. In fat people, especially women, and after typhoid fever, influenza, malaria, and pregnancy, it is within the medical man's power to advise a change in the patient's mode of life which will tend to prevent or diminish the liability to catarrhal inflammation of the gall-bladder and bile-ducts. The points to be borne in mind are to prevent stagnation of bile in the biliary tract, or to obviate or remove any inflammatory condition of the mucous membrane of the duodenum, biliary papilla, bile-ducts, etc. Gentle exercise in the fresh air if possible to favor the passage of bile into the intestines is advisable. When this is not practicable, breathing exercises to increase the movements of the diaphragm and the liver should be instituted. Stooping over desks and working in a cramped position must be corrected, while the use of tight corsets, belts, etc., should be discontinued. The patient should be warmly clad to avoid chills.

When we consider the nature of the disease, there is nothing to lead us to expect that operation, however improved or perfected, will ever prove an infallible remedy. The main purpose of the surgeon is to remove the stones; but can he claim that when he has removed the gall-stones he has got rid of the cause of them? Even when at a considerable risk to the patient—the mortality in the hands of so accomplished a surgeon as Mayo Robson is 16.6 per cent—he removes the gall-bladder, is there any guarantee that stones will not form in the duct? As a matter of fact they do, and other complications ensue as a result of operation. It is true that there is a gradual lessening mortality from operation, but it will be unreasonable to expect that a time will arrive when it can be undertaken without risk, or to imagine that beyond removing the gall-bladder and hepatic drainage anything more radical can be accomplished by surgery.

Weiss maintains that the medical man can do far more in the treatment of this disease than the surgeon. First of all, be it distinctly understood that it is not the purpose of the medical man by massage or electricity to remove gall-stones. It is quite true that gall-stones are sometimes removed by manipulations, but the risk is too great. Stones which have been resting in the gall-bladder may be forced to migrate and become impacted in the ducts. Inflammation of the gall-bladder, which may be slight, may become severe through such manipulations and dangerous consequences follow. Nor does Weiss regard it as the main object of treatment to dissolve the stones. He has under his care several patients who have not passed a single stone and are free from attacks of biliary colic. When Weiss first thought of giving to others the benefit of his experience, he asked a leading surgeon if he though it advisable that he, Weiss, should do so. The reply was that Weiss ought to do so by all means, if he knew of an infallible remedy. Of infallible remedies, Weiss knows nothing. If, as this surgeon implied, operation is to be regarded as likely to prove an infallible remedy, Weiss differs from him and regards his conclusions as neither warranted by facts nor by the pathology of the disease. When a patient has an attack of biliary colic and the disease is pronounced gall-stones, he lives under a constant dread of operation, and the depression thus produced, by interfering with the functions of the liver, tends to convert what may be a very simple malady into a serious one.

The general medical treatment of gall-stones and its various manifestations may be considered under the following heads:

The prevention of stagnation of bile; the prevention of the occurrence of catarrhal inflammation of the gall-bladder and bile-ducts; the removal of catarrhal inflammation when it has appeared; the attempt to dissolve and remove calculi from the gall-bladder and the ducts; and spa treatment.

[Massage of an infected gall-bladder is a distinctly dangerous procedure, and practically every gall-bladder causing symptoms is infected, for stones are not harmful in themselves.—Ed.]

FEEDING IN HYPEREMESIS GRAVIDARUM.

To the *Journal of the American Medical Association* of June 8, 1918, Bacon contributes a paper on this topic. He says that by intravenous feeding, all substances may be administered that are given by the subcutaneous method. Woodyatt, Sansum, and Wilder have shown the importance of regulating the velocity of the flow of the solution and have found that 0.85 gm. of glucose per kilogramme an hour can be given without causing intolerance. At this rate about 40 gm. of glucose could be given every hour to a woman weighing 50 kg., and in six hours about 250 gm., which would give about 1000 calories. The method is valuable in emergency when available. It requires a special apparatus and technique and is hardly practicable for ordinary use.

Rectal feeding remains the most practicable and, when properly given, is efficient. By this method all essential food elements can be supplied, such as water, salts, glucose, amino-acids, and vitamines. The

deficiency in nitrogenous foods can be made up in part by giving an excess of glucose and by alcohol. Sedatives, especially sodium bromide, can be added as needed.

Because there is no digestion in the rectum or colon, no attempt should be made to give undigested proteins. Amino-acids and peptones dialyzed from artificially digested meat or milk may be given. Because sugar and starch digestion does not take place in the colon, carbohydrates should be given in the form of a mono-saccharid, preferably glucose, which is absorbed without change. As the absorption of fats is doubtful, they should be omitted.

An energy food of great importance in rectal feeding is alcohol. According to the valuable studies of Neumann, alcohol is more readily utilized by the tissues than the other energy foods, carbohydrates and fats, even when they are present in large amounts, and its administration leads to the same economy of protein as the ordinary non-nitrogenous constituents of the dietary. As alcohol is more easily absorbed than glucose, and as it helps to prevent fermentation in the colon, it proves of great value when given in proper amounts and concentration. If given in excessive quantities or too great concentration, it may be eliminated unchanged and may also injure cell tissue. If given in not more than a 5-per-cent solution and not to exceed 100 gm. a day, it is practically all consumed and harmless.

The great importance of calcium makes it desirable to add a calcium salt to the injection. The constant acidosis indicates the addition of sodium bicarbonate. To diminish the central reflexes, sodium bromide may be substituted for the basic salt sodium chloride in sufficient amounts, generally from 3 to 4 gm. per liter (quart). There is reason for giving a solution of salts of concentration to make an isotonic solution. It is probably better to restrict the salts to 7 per thousand.

The solution should be at body temperature. This cannot be secured by heating the solution in the irrigator and letting it drop through an unwarmed tube. It is necessary to warm the tube near the distal end—that is, just before it is joined to the rectal tube. This can be done by means of hot sand-bags. The rate of flow of one drop a second, giving 500 Cc. in two hours, is nearly always tolerated, if the rectum and colon have been properly prepared.

A large enema of at least one liter should be given every day to remove particles that continue to come down from the small intestine, and also substances that may be excreted from the mucous membrane of the colon. This enema should be a hypotonic solution—for example, 5 per thousand of sodium chloride—in order that some water may be absorbed from it. A small amount of alcohol, one per cent, may be added in the hope that a little nutriment may be supplied in this way.

The cleansing enema may be given early in the morning, at 7 or 8 A.M. Then the nutrient enemas would start at about 9 A.M., 2 P.M., and 7 P.M. Sometimes it will be found desirable to add ten drops of tincture of opium to the evening enema.

The composition of the rectal feedings will have about the following proportions: Glucose, 50; alcohol, 50; calcium chloride, 0.3; sodium bicarbonate, 3; sodium chloride or bromide, 4; vitamine, as much as is sufficient; distilled water, enough to make 1000. From 300 to 500 gm. are to be given three times a day. This mixture has an energy value of about 550 calories. If 1500 Cc. are given each day, the patient will receive 825 calories. In two or three days the retching stops, the thirst disappears, and the patient is in a fairly comfortable condition. The great nitrogen loss is stopped and the total nitrogen output in the urine is often reduced to 3 gm. in twenty-four hours. The ratio of the ammonia nitrogen to the total nitrogen also falls, although it may still remain more than 20 per cent.

It is a difficult task to determine when stomach feeding may begin. As a rule, it is better to be cautious than hasty. The returning appetite of the patient and her confidence in herself is at times a guide. If the pregnancy is approaching the fourteenth week and the uterus is raising out of the

pelvis, the mental change is often remarkably sudden. Likewise in markedly neurotic patients the cures are often sudden. Lavage of the stomach is frequently very desirable before beginning oral feeding. The foods best taken are generally some forms of milk, such as peptonized milk, malted milk, and buttermilk. Egg-albumen is added early. Rectal feedings are discontinued gradually and not until the stomach feeding is reëstablished. Even when the patient has recovered completely, she should be kept under control until the sixteenth or eighteenth week, as discouraging relapses are not uncommon.

Management along the lines indicated promises success in practically all cases in which patients are treated before inanition becomes extreme. The great difficulty is generally in obtaining and keeping control of the patient, largely because of outside influence. In a patient under control, the induction of abortion is practically never required.

THE TREATMENT OF TUBERCULOSIS.

In the *Military Surgeon* for June, 1918, BUSHNELL states, in a general article on this topic, that he has seen too often very serious harm from tuberculin, as employed by others, to be enthusiastic concerning its use. Tuberculin is most helpful to those who need help least. Advanced cases of tuberculosis are very seriously injured by it, but the rather numerous class of sanitarium patients who have little or no active tuberculosis, their disease being of a chronic, though often diagnosticated as acute, type, are able to tolerate it, sometimes apparently to their advantage. Those physicians whose practice is mostly confined to cases of well-marked, manifest pulmonary tuberculosis are rarely enthusiastic advocates of its use. An accurate diagnosis is indispensable. Tuberculin in the hands of the ignorant is a terribly deadly weapon. The writer believes that cases of genuinely active tuberculosis are more often harmed than benefited by it, and is of the opinion that better results in the long run for the average patient are attained by the psychical treatment. He is therefore opposed to its use in army hospitals.

[We have repeatedly advocated these views in the THERAPEUTIC GAZETTE in previous years.—ED.]

PNEUMONIA AND ITS TREATMENT.

In the *New York Medical Journal* of June 8, 1918, COHEN writes a general review of his and other methods. He has great faith in quinine, and for oral administration he prefers either the quinine and urea hydrochloride or the dihydrobromide, encapsulated. The initial dose by the mouth for a young, robust adult should be not less than 1.6 grammes (25 grains); by intramuscular injection, not less than 1 gramme (15 grains) in extemporaneous fifty-per-cent solution in boiling water; by the vein, not less than 0.6 gramme (10 grains) in one-half- to one-per-cent solution, in distilled water, or in saline solution (NaCl 0.85 per cent), or in one-half-per-cent solution in a two-per-cent solution of a mixture of primary and secondary sodium phosphates (1:8) in saline solution or distilled water.

These quantities may be exceeded in so-called sthenic cases, with high fever and hard, pounding pulse. For the aged, and for children of fifteen years or less, they should be reduced about one-half.

The first dose, however, is tentative, and upon its effect, as shown within three hours, will depend the size of the second dose and the frequency of repetition. Sometimes only a single dose is needed; sometimes three or four doses will be sufficient; sometimes ten or fifteen doses or more are required. For a convenient index of effect, as already stated, the temperature curve is taken, and, in the absence of contraindication, the standard dose of 0.6 to 1.6 grammes (10 to 25 grains) is repeated every third hour by vein, muscle, or mouth, until the temperature falls some two or three degrees to about 102° F. and remains at or below that (approximate) figure. After that the drug is given every fourth hour, or every sixth hour, or at longer periods, as may be required to maintain the effect. Also, the size of the dose is varied in accordance

with the degree of influence, and the apparent needs and reactions of the individual patient; being increased or diminished—and usually diminished—as circumstances may indicate. In other words, individualization, which is part of all rational therapeutics, applies here as elsewhere.

Thus, if temperature is distinctly reduced but not to the 102° mark, the dose may be reduced to ten grains. At times a dose of five to ten grains by the mouth is given routinely every third hour, even if the temperature falls below 102° F.; for if the temperature is only 102° F. to begin with, the initial dose is given nevertheless. The aim is to get the patient under the complete influence of quinine as soon as possible, using as much as is necessary for that purpose; and afterward to continue the effect with the smallest quantity that will give results.

In this connection, emphasis must be laid upon the fact, previously mentioned, that pneumonia patients exhibit a peculiar tolerance toward quinine. Even mild cinchonism develops so rarely under enormous and long-continued doses that one is tempted to doubt the diagnosis in the few instances in which it is observed. Solis-Cohen has seen it less than half a dozen times in considerably more than 600 cases. On the other hand, in half a dozen instances of an opposite kind—patients with quinine idiosyncrasy who have contracted pneumonia—it has been found possible to give doses of the drug that under normal conditions would drive the subject crazy, without inducing the slightest discomfort; and, as it happens, in every one of these instances, with uncomplicated recovery from the malady. In two of these patients the attempt was made, a year after recovery from pneumonia, to test the continuance of the anticinchonic effect. In both, quinine symptoms quickly developed after a dose of five grains, given without informing the patients what they were taking.

To summarize, the dose of any quinine salt by any method of administration is: enough to produce results and no more.

Cocaine hydrochloride (one-half to one grain, 0.03 to 0.06 gramme), posterior pituitary preparation (one mil of the commercial solution), and one mil of the 1:1000 solution of adrenalin hydrochloride were used as pressor agents in the early years of the definite treatment, without special preference for one or another, until experience should demonstrate which was best. Cohen has now settled upon the pituitary preparation for two reasons. Its effect is greater than that of cocaine; and while less prompt, much more lasting than that of adrenalin; and, moreover, introduced simply for its pressor effects, it proved to have the additional advantage of tending to prevent tympanites, and of helping to overcome that symptom when present.

Since Cohen first pointed out this secondary value of pituitrin, it has been confirmed by so many writers that he feels he need not dilate upon the fact, except to emphasize some features which, seemingly, are not even yet thoroughly well known.

In the first place, pneumonic tympanites is not intestinal only or chiefly, but is frequently a manifestation of dilatation of the stomach. Percussion to the left of the xiphoid in pneumonia is as important in routine examination as percussion to the right in typhoid fever. When even a moderate gastric dilatation is indicated by the extent of tympany or hyperresonance in this region, and before hiccough or general distention occurs, the stomach should be immediately washed out with a sufficient quantity of hot alkaline solution (*e.g.*, sodium borate one to five per cent) and hot compresses placed over the epigastrium. The pituitrin should then be injected intramuscularly every hour, or, if preferred, every two hours in alternation with eserine salicylate (one milligramme or one-sixtieth grain)—that is, one or the other hourly. This should be kept up for four hours, or longer, if necessary. If hiccough has occurred and is not relieved by the lavage, scopolamine hydrobromide (one-fourth to one milligramme or 1/250 to one-sixtieth grain) with or without morphine sulphate (five to fifteen milligrammes or one-six-

teenth to one-quarter grain) may be added to the eserine.

Intestinal distention is to be treated in practically the same manner, with perhaps lavage of the colon instead of gastric lavage —milk of asafetida being added to the solution. Also a turpentine stupe may be substituted for the epigastric compress.

To return to the pressor influence of pituitrin and like preparations. Two considerations dictated their employment: massive doses of quinine salts—and this is even more marked with optochin—tend to lower blood-pressure by cardiovascular depression. To guard against this, the pressor agent is injected simultaneously with the first dose of quinine. It may be given by the mouth also, but is not so prompt in action, and not nearly so efficacious. Twice the dose (and probably twice the frequency) will be necessary.

As pointed out by Gibson of Edinburgh and emphasized by Hare of Philadelphia, the systolic blood-pressure curve in pneumonia, if charted in millimeters of mercury on the same vertical as the heightened pulse frequency curve beats per minute, tends to fall below the latter, whereas normally it is some sixty to seventy points higher. This indicates a dangerous degree of vasomotor depression. As the pressure curve rises, and the pulse frequency curve falls, the prognosis becomes better; and when the pressure passes again to ten or twenty points beyond the pulse, recovery is to be anticipated.

Gibson spoke only of the prognostic value of this relation; and many subsequent observers have denied it. Cohen's own experience amply confirms it, however, and he relies on it with as much confidence as on any clinical fact of observation. It is not infallible, but when taken in consideration with all other features of the case it is a valuable guide.

Hare emphasizes its therapeutic significance as a guide to the use of cardiovascular stimulants. It is this feature that has been incorporated into the definite plan. So long as the systolic pressure curve is less than five points higher than the pulse curve, the pituitary injections are repeated every third hour. If greater effects seem required, cocaine is given alternately, or cocaine, camphorated oil (two mils—thirty minims —of the twenty-per-cent solution), and pituitrin are used in succession, one or the other hourly. It is said that camphor interferes with quinine, but Cohen has not observed this. Camphor alone has been urged as a sort of specific in pneumonia. His own experience has been confined to its use for special indications. Subjects of arteriosclerosis, however, may be given the benefit of their abnormal arterial pressure; pituitary and its auxiliaries being omitted. Thus, in cases of patients with systolic pressures ordinarily exceeding 180 (and even 200) millimeters of mercury Cohen has observed the curves fall to 150 or less during pneumonia; and in some cases in which depressor agents, such as aconite and veratrum viride, were needed prior to the attack, the necessity for such medication has not recurred for twelve months or more after recovery from the "lung fever."

Foxglove has perhaps a double part to play in the treatment of acute pneumonias. Some physicians rely upon it almost exclusively, attributing to it the same place that in the definite treatment is at present given to quinine. They use it in very large doses, as much as thirty minims of the fluid extract being given every two or three hours, until its effect upon the heart is manifested in the pulse. Cohen has read somewhere, but has mislaid the reference and has not been able to find the article again, some account of test-tube experiments in which digitalis is stated to have a neutralizing influence upon the poisons of the pneumococcus. Be this as it may, these two clinical facts are beyond dispute: That when digitalis alone is used, its characteristic effects upon the circulation are manifested only with enormous doses, and sometimes only when such doses are given from the outset. When quinine is used in the large doses advocated as part of the definite treatment, digitalis effects can be produced with smaller (*i.e.*, ordinarily full) doses of the drug.

THE EFFECT OF PHOSPHORUS ON GROWING, NORMAL AND DISEASED BONES.

An interesting study of this subject is reported in the *Journal of the American Medical Association* of June 8, 1918, by PHEMISTER. After quoting experimental investigations he reports cases of disease treated by phosphorus and says that his findings show that phosphorus affects the normal bones of children in much the same way as described by Wegner for experimental animals. The effect on enchondral bone growth is especially well marked. No definite increased transverse growth could be made out, but if slight it would easily escape detection by means of the Roentgen ray, especially as the technique varied with each set of plates. Also for some time after the phosphorus is stopped there is a continued but less marked overproduction of bone in the juxta-epiphyseal region of the shaft, which is probably due either to the cumulative effect of phosphorus or to the stimulating influence of the excessive stores of calcium salts in the neighboring bone.

The diseased bones showed certain variations. In osteogenesis imperfecta, the transverse growth was as strikingly affected as the longitudinal. All fractures occurring during the period of observation healed except one at the middle of the left humerus, which occurred during the period of interruption of the phosphorus, an inactive stage of non-union being established before renewal of the drug. Judging from the general effect it produces, phosphorus if given early in fractures during the active period of repair should stimulate callus formation and ossification. In non-union, however, when the natural reparative impulses have been exhausted, little should be expected from its use.

Roentgen-ray studies of the bones during the administration of phosphorus alone and with other substances in rickets should be of interest. These observations show clearly that phosphorus when given alone has a marked stimulating effect on bone production and consequently of calcium accumulation in the normal zones of growth, and speak against the assertions of Schabad relative to calcium metabolism in healthy children.

During the florid stage of rickets, the bony tissues have lost the power of depositing lime salts; and as phosphorus is presumably unable to restore this power, no appreciable effect from its administration would be detectable by means of the Roentgen ray, although it may increase the amount of osteoid tissue formed. During the healing stage, when the power of laying down lime salts begins to return, the phosphorus would stimulate the formation of osteoid tissue and consequently increase the amount of bony tissue formed. It must be remembered that during the healing stage of rickets, from the rapid ossification of osteoid tissue piled up in the metapophysis during the florid stage, a condition forms which roentgenologically resembles very much the phosphorus changes in normal bones. Phosphorus administration would intensify this condition.

SENSITIZED VACCINES IN THE PROPHYLAXIS AND TREATMENT OF INFECTIONS.

In the *American Journal of the Medical Sciences* for June, 1918, CECIL reminds us that it has been shown by numerous investigators that a vaccine sensitized with a homologous serum produces less local and constitutional disturbance when injected subcutaneously than does a non-sensitized vaccine, and even living virulent organisms when properly sensitized can be injected subcutaneously without serious consequences.

It has been maintained by some that sensitized bacteria, either living or dead, produce a more rapid and efficient immunity than non-sensitized bacteria do. This question, however, cannot be considered settled as yet.

Sensitized vaccines have been extensively used for prophylactic and therapeutic purposes.

The author has employed sensitized vaccines in a series of 47 cases, which include

20 cases of prophylactic vaccination against typhoid fever, and 27 cases of therapeutic vaccination against gonococcus, streptococcus, staphylococcus aureus, and tuberculous infections. The sensitized typhoid vaccine produces a somewhat milder reaction than ordinary typhoid vaccine, and probably gives just as high an immunity. At the present time, however, the evidence for its superiority is not sufficient to justify the substitution of sensitized for ordinary vaccine in practice.

In the various infections treated with sensitized vaccines the results were, as a rule, no better than would have been expected with ordinary vaccine. It happened that in a few instances recovery followed the administration of sensitized vaccine after treatment with ordinary vaccine had failed. This may have been due to the fact that larger doses could be employed without untoward symptoms.

The chief objection to the general use of sensitized vaccines is the increased labor and time necessary for their preparation.

At the present time it would seem desirable to limit their use to the treatment of infections in which there is hypersensitiveness to ordinary vaccines or in which the latter have proved inefficacious.

A CLINICAL STUDY OF 150 CASES OF BRONCHIAL ASTHMA.

In the *Boston Medical and Surgical Journal* of June 6, 1918, RACKEMANN states that the treatment of asthma resolves itself into the treatment of the exciting cause in the individual patient.

When the history, or the patient's experience, is compatible with the skin tests as showing susceptibility to some foreign protein, repeated parenteral injections of that foreign protein will usually have a marked beneficial effect and may cure. Avoidance of the offending protein, if possible, is the simplest remedy. Cases of intrinsic asthma can be treated by mechanically removing the cause, but this does not often effect a permanent cure.

Emphysema cases do remarkably well on expectorants—especially potassium iodide. Repeated injections of the patient's own blood, removed and defibrinated, has temporarily relieved two patients, but has failed in five others.

Autogenous vaccines or organisms in the patient's sputum sometimes relieve temporarily.

Frequently unsuspected and apparently unimportant suggestions, such as a temporary change of residence, a slight temporary modification of the diet, small doses of calcium lactate, ether anesthesia, temporary rest in bed with full diet, correction of faulty position, have been of the greatest assistance, and not infrequently have led to a virtual cure.

One great difficulty is that in all these various methods there is rarely any good control because so many patients have intervals of freedom from attack—which intervals have lasted for several years.

A CONSIDERATION OF THE COMPLICATIONS OF POLIOMYELITIS AND OF THE GENERAL TREATMENT OF THE ACUTE STAGE.

REGAN in the *Archives of Pediatrics* for May, 1918, writes exhaustively on this topic. He thinks rest is an all-important part of the treatment. During the very acute stage, comprising the first few weeks of illness, a child should be disturbed only when necessary. If at home he should be placed in an exceedingly quiet room so as to exclude all noises and bright lights. Sleep should be thus encouraged, for the entire central nervous system is concerned in the inflammation, and the less the demands made upon it at this particular period the better the ultimate outcome will be. Where hyperexcitability and restlessness are marked Regan has found the use of morphine, in doses proportionate to the age of the patients, to be of value, especially when combined with frequent baths and the employment of lumbar puncture.

It seems to Regan that, as soon as the painful period of the disease is over, the patient should be permitted to use his muscles just as much as he desires, but

without undue urging. As long as the pain is present in the limbs the child has no desire to use them, and it is harmful and useless to make him walk sooner than he can do so with comfort. As a rule the children should make use of their limbs of their own accord as soon as they are able to. This latter principle Regan adheres to strictly in the treatment of his patients by never confining them to a recumbent posture after they are able to get up with safety and comfort, provided no marked deformity of the lower extremities or of the spine exists. A degree of caution is, of course, necessary in watching these patients after they are up, in order that if any tendency toward deformity is noticeable, suitable corrective measures may be immediately applied, and the harmful movements discontinued at once by placing the child in bed. No doubt the continuation of pain is indicative of the fact that the inflammatory process in the nervous system has as yet not completely subsided, and is nature's method of protection from further injuries.

When the patients are convalescent enough to sit up, which occurs usually in the third or fourth week, it is noticed that they are frequently uncomfortable and suffer considerably if propped up in bed with pillows or a back rest, with the legs at a right angle to the body. But they can be made much more comfortable and the sitting posture attained much earlier if they are placed at the edge of the crib so that their legs can hang down outside the bars, at the same time grasping the bars in order to support themselves. Moreover this is valuable in that it also provides leverage for the exercising of certain muscles.

A very similar position is obtained by using a small armchair with a straight back and a tray attached. This particular type of chair proves of invaluable aid in getting the more severely paralyzed children up without subsequent danger of injury from falls.

The routine diet for children over one year consists of milk for the first three or four days, then bread and cereal are added, and after the seventh day the child is given a full diet consisting of everything but meat. The soup is made with less meat and more vegetable juice than usual. Once a day apple sauce and prunes are given. There is practically no danger in giving a full diet early in the disease, because nephritis is an almost unknown complication. On the contrary, frequent feeding in ample quantities is definitely indicated by the ravenous appetite of the children, as well as by the rapid and progressive wasting that often appears in the paralyzed parts. In the case of infants, breast-feeding is to be used whenever possible; artificial feeding being resorted to only when the natural method is unattainable.

In the treatment of the first few days of the disease it is important to remember that the first therapeutic measure to be employed is the administration of a good full dose of an active cathartic, preferably calomel, in divided doses, followed by castor oil or magnesium sulphate, in order to prevent as much as possible the further absorption of the causative agent of the malady or its toxin from the intestinal tract. Their elimination may also be aided by the daily use of colonic irrigations of saline solution.

Constipation is often an exceedingly difficult problem to handle, especially in the older patients. A mild laxative is usually effective in the younger children, and for this purpose milk of magnesia or castor oil may be employed with satisfactory results. In adults and older children more drastic measures are required, and in these patients calomel followed by magnesium sulphate is necessary. Even such cathartics prove ineffective in some of the more severe cases, and fecal impaction not infrequently occurs. In such instances enemata of olive oil, glycerin, and turpentine at four-hour intervals are usually successful. Occasionally, however, the feces are so hard, and the rectum so distended, that they have to be broken down with blunt instruments and scooped out with a spoon before an enema can be given. It is found advisable where this tendency exists to give internally 1 to 2 ounces of olive oil every other day until the condition disappears.

ALCOHOL IN PNEUMONIA.

The *British Medical Journal* of May 11, 1918, quotes SHATTUCK of Boston, who, in an address dealing with a history of medicine during his lifetime, discusses the value of alcohol in pneumonia.

Dr. Shattuck suggests that the pendulum may have swung too far away from alcohol in grave cases, and asks if fifty years hence alcohol will be regarded as always, everywhere, and in all circumstances the unmitigated poison that it is to some present-day apostles and the American Medical Association; its undoubted abuse in the past does not affect the belief that in some instances it is life-saving, but, as Opie said of his pigments, it must be mixed with brains, and the best results are obtained only under skilled supervision which contraindicates the repetition of the dose while its toxic effects, such as flushing, or its odor in the breath persist.

EFFECTS OF ANTACID MEDICATION ON GASTRIC ACIDITY AND SECRETIONS.

CROHN in the *American Journal of the Medical Sciences* for June, 1918, reports a research which indicates the uselessness of alkalies in gastric acidity. As he well says, one must feel surprised and disappointed upon realizing the mode of action of the antacid agents, more particularly the alkaline salts. It is obvious that much misuse of these therapeutic potentialities has taken place. With too small a dose no beneficent neutralization is accomplished, while the attendant secondary rise in acidity rarely fails to assert itself. When too large a dose is employed one risks paralyzing the digestion for a considerable period, following which there appears a hyperacidity of even greater degree than that we undertook to combat. The combination of slowly acting with more rapidly acting alkalies is desirable. Atropine has a restricted use and should be employed only as a desiccating agent in instances of hypersecretion.

The use of fractional doses of the alkalies distributed over the course of digestion is the most efficient and physiological method for the employment of these agencies; for this purpose magnesium oxide is the most dependable and best suited salt.

Based upon these studies it seems very questionable whether prolonged use of the alkalies leads to any permanent diminution of the acid secretion of the stomach; in fact, it is as likely that the opposite effect is produced.

A lasting relief of hyperacidity is not to be sought in antacid medication, nor in olive oil or atropine. It is more likely to be found in the proper regulation and restriction of dietary errors as well as in the general control of the hygiene and manner of living of each individual patient under our professional care.

CARBOHYDRATES IN DIABETES.

The *Boston Medical and Surgical Journal* of June 6, 1918, points out that when the value of administering carbohydrates in diabetes was first understood it was thought that certain carbohydrates behaved differently from others. Oatmeal was supposed to have a special value as a carbohydrate cure because it was thought that the starch in it had a special action; that it had certain special ferments or extractives of value; or that it reduced the permeability of the kidneys to sugar. None of these hypotheses has any substantiation, and any value that oatmeal has in the so-called "oatmeal cure" must be ascribed to the general value of carbohydrate administration, where there is a defective carbohydrate oxidation, and where the organism is using up its own body proteins to make up the deficiency naturally withdrawn because of the metabolic condition, or artificially withdrawn in a mistaken notion of treatment.

The most recent conception of the proper treatment of diabetes takes into consideration the metabolic disturbance at the base of the disease, as well as the part that the carbohydrates play in the disease. The starvation treatment has for its object, therefore, the resting of the metabolic system for the period of the starvation. The subsequent dietary treatment no longer con-

templates the withdrawal of the carbohydrates, but rather that they be given in sufficient quantities for the needs of the system, without necessitating drawing on the body protein. On the other hand, it is not intended to tax the metabolic processes by administering large quantities of food. Every element of food is reduced to the minimum needs of the body. When it is remembered that a reduction of half of every one's dietary would be beneficial rather than harmful, there need be no fear of underfeeding in an organism whose metabolic system is damaged. Most of all is the protein kept at a minimum in order to reduce the tendency to acid production.

ANALGESIA BY ORAL ADMINISTRATION.

The *Lancet* of May 18, 1918, refers to this method in the following words:

The production of euphoria during the dressing of painful wounds by oral administration of analgesic drugs serves to whet the appetite for more information on what appears to be a very important branch of the anesthetist's work. The report of a case will best illustrate the results claimed.

A soldier, aged thirty-six, who had received a gunshot wound of the right thigh, and had an infected compound, comminuted fracture of the femur, had found previous dressings very painful, and the splint could not be changed without general inhalation anesthesia. He was given paraldehyde, 1 fluidrachm; ether, 3 fluidrachms; and liquid petrolatum, 4 fluidrachms. In fifteen minutes he fell into a light sleep. The wound was dressed, the splint removed, the through-and-through wound irrigated with ether, a gauze drain inserted down the femur, and a Thomas splint applied with extension. The patient talked during the dressing, felt practically no pain, and suffered no nausea or other unpleasant after-effects. The dressing was repeated in a similar manner every other day for four dressings, and in none of them was there pain or any alteration of pulse or respiration.

The authors of this plan are well known as careful and trustworthy workers, so that a further and fuller account of the method will be awaited with impatience. As a possible means of releasing anesthetists from ward work and enabling them to continue the essential attendance in the operating theater the suggestion is well worth considering. At a base hospital it would be an inestimable boon to be able to render a patient analgesic without the necessity of inhaling ether or chloroform with the aftermath of unpleasant taste and smell and of some increase in the toxic condition of the patient, which is already a source of anxiety. Unless unforeseen drawbacks arise, the new method should prove of service not only in military surgery but also in civil work. Before, however, we can accurately estimate its real value we must have further information on such points as the length of time taken to eliminate the drugs, the after-condition of the patients in regard to nausea, sickness, the smell and taste of ether, and their general well-being. At present the ideal method is to give gas and oxygen, and when by the use of a portable, or preferably wheelable, machine the patient can be anesthetized where he lies, the gain is great in the avoidance of pain or of administering anything of a toxic nature. It remains to be seen whether the oral method of Gwathmey and Karsner will prove a serious competitor to gas and oxygen in dealing with dressings, emergencies, and short operations, especially as a means of economizing man-power in anesthetists.

"BOTULISM" AND HEINE-MEDIN DISEASE.

In the *Lancet* of May 18, 1918, CROOKSHANK writes on this comparatively new topic. On the whole it may, he thinks, be stated with some confidence that there is at present in London (and elsewhere) an outbreak of cases *clinically* indistinguishable from examples of Heine-Medin disease. There is, in a word, *clinical* identity between this outbreak and a Heine-Medin

outbreak. Whether there is pathological identity as well; whether there is really such a disease as botulism, simulating some types of Heine-Medin disease; ["Heine-Medin disease" is applied to a group of paralyses including Landry's paralysis, pontine paralysis, poliomyelitis, etc.—ED.]; and whether, if so, there are any cases of true botulism now in London—are questions that cannot be answered by appeal to logical, clinical, "pathological," or epidemiological methods, but which depend for their solution on bacteriological, serological, and experimental investigations.

Until and unless these questions are solved, and their solution is one of widespread and far-reaching importance, the problems of immunization, both prophylactic and curative, cannot be hopefully attempted. But at the risk of reiteration, it must be said that two points must be borne steadfastly in mind:

(I) It is *possible* that the name *Heine-Medin disease* has been applied to outbreaks which, though clinically identical, or nearly so, may yet be *capable of differentiation* (*a*) biologically, and (*b*) epidemiologically. For (*a*) the Heine-Medin virus may be biologically multiple, as is the parasite of malaria, or may occur in diverse strains, and (*b*) the Heine-Medin disease may be propagated in a multiplicity of ways at different times, as is typhoid fever. Hence problems relating to food preparation, food distribution, and food consumption must not be ignored or lightly treated.

(II) It is *possible* that outbreaks closely resembling those of classical Heine-Medin disease, or some forms of that disease, may be due to virus that is *totally separate* from the virus of that disease.

If—and there seems no reason at present to dispute it—the "Flexner bodies" *do* represent the Heine-Medin virus, or one phase of it (Rosenow), and botulism is a reality, the latter proposition represents not a possibility, *but a fact*. It then remains to be determined if specific infections or intoxications other than botulism exist, giving rise to similar clinical pictures.

It may be pointed out that only four acute specific diseases essentially affecting the gray matter of the central nervous system—namely, tetanus, rabies, Heine-Medin disease, and botulism—have been shown so far to be connected with a particular virus; and while in certain examples of three of these the clinical pictures may be almost identical, in all four the post-mortem appearances may be so similar ***in kind*** that for none of them can it be said that they are specific.

A few words on some practical issues may be added.

1. Collective investigation—clinical, pathological, epidemiological, bacteriological, and experimental—both at home and abroad, amongst civilians and amongst the troops in the field, should be instituted at once.

2. Investigation should be retrospective as well, and devoted to inquiry as to the prevalence at home and abroad, during the past year or two, of "sporadic analogues" of the epidemic Heine-Medin types.

3. Inquiries should be specially directed to the presence, past and now, of "sporadic analogues" amongst troops at home and abroad. Attention should be given to the lines of communication of the present disease, in view of the known fact that the Heine-Medin affection tends to be propagated along lines of traffic.

4. Cases under investigation should be for the present, if not segregated, at least subjected to rigorous "bed-isolation"; and particular attention should be paid to all which may represent "abortive" types of Heine-Medin, or other disease found to be prevalent.

Cases of "septic bronchopneumonia" and gastrointestinal disorder should be regarded, if anomalous in type, with grave suspicion, especially if leading to a rapidly fatal result.

In respect of individual treatment the following suggestions are made:

1. Rest and good nursing are essential.

2. Careful cleansing of the mouth and pharynx; and attention to the state of stomach, bowels, kidneys, and bladder are imperative.

3. There is experimental and clinical

evidence in favor of early, and at first intensive, administration of urotropin, which, it is believed, may be combined usefully with salicylate of soda and benzoate of ammonia, in free doses.

4. The employment of strychnine is of use in cases attended by bulbar exhaustion, or by paralysis of the muscles concerned in respiration.

5. The application by an atomizer of liquid paraffin to the mouth, nose, and pharynx alleviates dryness of the passages and by lessening foulness diminishes the risk of secondary pulmonary affections. To this end a drop or two of oil of peppermint, or of izal, may be shaken up with each ounce of liquid paraffin used.

6. Confinement to bed should be prolonged rather than curtailed; and cases "discharged" should be watched, for at least three months, in order that record be obtained of any sequelæ or permanent disability.

Since these notes were written the position has become more clearly defined. The present cases, it may be asserted, are cases of the Heine-Medin disease. The outbreak is, epidemiologically and clinically, identical with the great epidemic in New York of 1916. It has been "brewing up" in London since last autumn. All ages are affected, and the cases are of every grade of severity and of every clinical variety. It is of importance (1) that cases occurring in adult and advanced life should not be regarded as varieties of "hemiplegia," "myelitis," "cerebral thrombosis," "uremia," and so forth, but their true nature recognized; (2) that the profession recognize (*a*) cases with abortive nervous symptoms, and (*b*) "abortive" cases with *no* nervous symptoms.

The disease has three clinical stages:

(*a*) That of initial illness, with, perhaps, sore-throat; respiratory or gastrointestinal disorder; headache and fever. This stage may be: (1) so trivial that it is overlooked at the time; (2) such as to attract attention and treatment as "influenza," and so forth; (3) so severe that it is *fatal* in a day or two. Sometimes nervous symptoms occur in this stage.

(*b*) A latent period that may be very short (twenty-four hours or less), or prolonged to perhaps a fortnight or even more.

(*c*) The stage of definite nervous symptoms. This stage may be: (1) absent or (2) "abortive," (3) rapid or (4) *sudden* in onset, (5) "paralytic" or (6) "non-paralytic," (7) so consecutive to (*a*) as to appear clinically a part of it, or (8) so removed from (*a*) by (*b*) that connecnection is not at first considered by the medical man. Abortive nervous cases are quite common, and Crookshank has seen some diagnosed as "functional." But it is very difficult to say (1) how many cases occur without nervous symptoms, and (2) how many immune carriers there be.

The disease is communicable, *especially in the stage called "a."*

DIAGNOSIS AND TREATMENT OF ANTHRAX.

In the *New York Medical Journal* of June 22, 1918, SCHWARTZ proposes the following method of extirpating the pustule by means of the actual cautery: The cautery should be applied about two inches away from the pustule, making a circle of about four inches, the same as done with the scalpel. Bring cautery to fascia and lift pustule intact. The destruction of the pustule is done from below upward, instead of from above downward. If the pustule is on the ear, nose, or cheek, the extirpation cannot be made quite as radical. The method does away with any possible danger of forcing the bacilli into the general circulation by means of direct pressure, and therefore accomplishes a much-wanted and sought-for method of extirpating the pustule without exposing the patient to the possible spreading of the infection to the circulation or to adjacent tissues or structures. It is also to be preferred to the excisional method, for the reason of its greater simplicity. It is also practically a bloodless procedure; thereby diminishing the possibility of infection of the operator. The skin surrounding the pustule should be painted with iodine. This method is, so

to speak, a cautery extirpation instead of a cautery destruction.

For after-treatment free incisions into edematous areas are essential. These incisions should be irrigated with Dakin's solution in the same manner as other wounds. The place of extirpation can also later be freely incised for this purpose, but only if edema is present. Dudley injects eight-per-cent phenol in advance of the spreading area. An ice-pack should be applied over a wet dressing.

Points to be remembered in the treatment are: Treat promptly; cautery extirpation; Eichhorn's serum; free incisions in edematous areas; irrigation of these incisions with Dakin's solution; ice-packs and wet dressing of wounds; symptomatic.

THE PROPHYLACTIC USE OF QUININE IN MALARIA.

The *British Medical Journal* of May 11, 1918, contains quite an extensive article on this subject by TREADGOLD. He concludes that small doses of prophylactic quinine—not too long continued—are of proved utility to the natives of malarial countries, both in the absence of antimosquito measures and when such measures are incomplete.

Quinine may be given with advantage to immigrants under the following conditions:

(*a*) During short journeys when conditions with regard to mosquito prophylaxis are less favorable than usual.

(*b*) An occasional dose after an unusually tiring day.

(*c*) Nervous people may be advised to take an occasional course as an additional precaution in spite of efficient mosquito prophylaxis.

Speaking generally, it may be stated that quinine prophylaxis is usually a bad investment for immigrants in the absence of protection against mosquito bites; taking one thing with another, the practice would in their case seem to be little more than a pious fraud, which has been perpetuated from one generation to the next simply because public opinion throughout the world has never been sufficiently enlightened to encourage the working out of the problem on scientific lines. By a few well-planned experiments, carefully and simultaneously conducted in several countries, these conclusions might have been reached many years ago.

ACIDOSIS.

The *British Medical Journal* of May 11, 1918, quotes WHITNEY's contribution to this subject and says that in his remarks on the treatment of acidosis alkalies should not be given indiscriminately, for the neutralization of the acid ions is not the only thing to be considered; the salts thus formed must be eliminated, and if excretion is so poor as to allow acidosis to develop it is probable that these salts will also accumulate, and possibly to a highly dangerous concentration in the blood and tissues. Diuresis should therefore be promoted by giving large quantities of fluid by the mouth, under the skin, or perhaps best by Murphy's drip method of continuous rectal injection. Fresh air should be provided in the form of a gentle breeze across the face to prevent the rebreathing of carbon dioxide, which may prove the last straw to the overloaded respiratory center. Morphine, which is well known to be a respiratory depressant, must also be used with great caution.

POISONING FROM THE EXTERNAL USE OF WOOD ALCOHOL.

The *Lancet* of May 25, 1918, states that the fact that wood or methyl alcohol is a dangerous poison, whether taken by the mouth or inhaled, has been recognized for the last fifteen years, thanks entirely to American observers. Wood alcohol is used as a solvent in the arts. In America it has been prepared in a refined form, and this has been employed, because of its cheapness, by unscrupulous manufacturers, in preparing various flavoring extracts, such as "Jamaica ginger," "Columbian spirits," and other inferior products with euphemistic names. It is to their use that the cases of poisoning have been principally due. In England no such refined products have been

produced, and the disagreeable odor and taste of methyl alcohol prevent it from being taken by the mouth, although its increasing use in the arts and industries as a substitute for ethyl alcohol may likely enough lead to the production of a purer spirit. Numerous cases have been reported in America of poisoning from inhalation by workmen engaged in varnishing closets, small rooms with closed doors and windows, or beer vats. The symptoms are headache, dizziness, nausea, vomiting, and dimness of vision, often increasing to total blindness; they may terminate in coma and death. A characteristic of the severe cases which are not fatal is total blindness coming on in a few hours or days, then partial recovery of vision, and finally more or less complete permanent blindness, which is due to atrophy of the optic nerves.

In the *Journal of the Canadian Medical Association* for March Dr. R. E. McKechnie has reported what appears to be the first definite case of poisoning from the external application of wood alcohol. For a woman, aged forty-five years, with a sloughy surface on the leg over the site of a compound fracture, he ordered an alcoholic compress. After two days' treatment she became very drowsy. After three days she complained of nausea and blindness; the face was flushed, the pupils were dilated, and the blindness was complete. Investigation showed that the alcohol used was the refined wood alcohol, Columbian spirits. In spite of discontinuance of the application she became worse, the temperature rising to 100° F., the breathing becoming hurried, and the patient being stupefied. She recovered, but the optic atrophy remained, and vision amounted only to distinguishing movements of the fingers. In this case the alcohol was applied to a raw surface for four days. Can this dangerous poison be absorbed through the intact skin? There is no evidence that it can, although the opportunity has been abundantly present in the extensive use of methylated spirits for making liniments and for disinfecting the hands and arms of surgeons. But, as Dr. McKechnie suggests, it is possible that investigation might trace cases of moderate impairment of vision to the continued external use of methyl alcohol. He is not "taking any chances," and has discontinued its external use since encountering this case.

PROGNOSIS IN PULMONARY TUBERCULOSIS.

FISHBERG in the *New York Medical Journal* of June 22, 1918, writes of the prognostic significance of preëxisting diseases. He believes that signs of preëxisting tuberculosis, especially during childhood, are indications of good resistance, otherwise the tuberculous process would have carried off the patient during the first attack. It has also been observed that tuberculosis developing in persons suffering from diseases of the cardiovascular and renal systems is only rarely progressive. Phthisis is exceedingly rare in patients with valvular heart disease, especially mitral stenosis, and when it does occur the tuberculous process pursues a mild course and prognosis is very good. This has been ascribed to the mechanical impediment of the lesser circulation which creates plethora of the pulmonary vessels. But when the tuberculosis occurs in a patient with pulmonary stenosis, the prognosis is very poor.

Phthisis in those with high blood-pressure, due to any cause, has an excellent prognosis. It is for this reason, perhaps, that arteriosclerosis is another condition which augurs well. Likewise, phthisis occurring in patients affected with chronic rheumatism, gout, nephritis, etc., is very mild and tends to cicatrization. These diseases are characterized by sclerosis of various organs including the lung, and sclerosis is nature's way of healing tuberculous lesions. Syphilis, when occurring in a consumptive, is apt to aggravate the prognosis of both diseases, but when tuberculosis develops in a person who has had syphilis for many years, the prognosis is very good. Here again the tendency to sclerosis comes in in good stead.

Preëxisting pathological processes in the nasopharynx, when of mild or moderate

severity, do not influence the prognosis, unless rhinologists become active with local and operative treatment. Conservatism in these matters may save the patient from an acute exacerbation of the tuberculous process. Bronchial asthma, chronic bronchitis, and pulmonary emphysema preceding the onset of phthisis indicate that the tuberculous process is likely to pursue a mild course.

A PRACTICAL DISCUSSION OF CARMINATIVES.

NILES in the *Southern Medical Journal* for June, 1918, says that the principal carminatives belong to the aromatic oils, alcohols, or ethers, and those which have in his observation seemed worth while in digestive discomforts are as follows: asafetida, cardamom, chloroform, ether, fennel, ginger, anise, cinnamon, lavender, bitter almond, and valerian. Whisky or brandy he does not consider desirable carminatives under any circumstances.

Asafetida, best in the form of the "milk," is an ancient and well-known ingredient of enemas, although it can be given freely by the mouth in psychasthenic states. In like conditions valerian may be prescribed, the most eligible form being the elixir of the valerianate of ammonium. This may be combined with the aromatic spirits of ammonia when the patient is quite weak, or with the elixir of passiflora in the presence of nervous irritability. Many patients belch more than necessary, and the vile taste and odor of either asafetida or valerian are a potent aid to their actual therapeutic value.

Both chloroform and ether in 5-drop doses exert a relaxing effect, being helpful in the presence of cardiospasm or pylorospasm. The compound spirits of ether, or Hoffman's anodyne, is also of service. These should be given every ten or fifteen minutes until the desired effects are attained.

Among his favorites for gastric flatulence are compound tincture of cardamom, compound spirit of lavender, or spirits of anise, fennel, ginger, cinnamon, or bitter almond. In order to obtain the best results he generally combines with them an antifermentative and an alkali—seldom a laxative. The objection to a laxative in a carminative prescription is the fact that its frequent repetition may cause undue catharsis.

The antifermentatives of choice are either resorcinol or zinc sulphocarbolate in one- or two-grain doses. Should resorcinol be employed, the patient should be informed that in a few days the white mixture will begin to turn a reddish-brown, becoming darker as time goes on. Without this information the medicine will be thought to have spoiled. The use of zinc sulphocarbolate is followed by no change of color.

The best alkalies, in Niles' experience, have been the milk of magnesia, or if the bowels were inclined to diarrhea, the milk of bismuth. The official mixture of rhubarb and soda, with its peppermint odor and taste, is also a good vehicle. In writing the prescription there should be incorporated about 15 or 20 per cent of water, otherwise the mixture is rather thick.

It is Niles' custom frequently to change the carminative content, while the other ingredients are kept the same. In this way habituation and monotony are avoided, and the patient feels that a new prescription is given each time. He ordinarily directs a dose to be given soon after eating and then repeats frequently for gas.

This is one of his carminative formulas:

℞ Tr. cardamom comp., f℥ ij;
Zinc. sulphocarb., f℥ss;
Magmæ magnesiæ, f℥ iij;
Aqua, q. s. ad f℥ iv.

M. Sig.: One teaspoonful after meals and repeat as needed for gas.

This will be found pleasant to take, and usually efficient in its effects. When this prescription is taken there can be substituted in the next compound spirit of lavender, spirit of anise, spirit of fennel, etc. When there is a tendency to nausea, Niles finds spirit of amygdalæ amara, or bitter almond, most grateful and helpful to the patient. Some of the other mentioned carminatives can be increased in dose, but the last named should not be given in doses of more than three or four minims.

In the presence of marked atony of either the stomach or intestines, the administration of pituitrin, preferably by means of the ampoules hypodermically, will prove serviceable. The tablets of pituitary extract, taken internally, have been of no service in Niles' experience.

PASSAGE OF DRUGS FROM BLOOD SERUM TO THE SPINAL FLUID.

To the *California State Journal of Medicine* for June, 1918, MEHRTENS contributes a paper bearing this title. He asserts that in the treatment of diseases of the meninges it is obviously of the greatest importance to be able to cause drugs, and other substances, to pass from the blood stream into the spinal fluid. While the meninges are intact these attempts have met with very small success, except with hexamethylenamine and occasionally with uranin. The possibility of arsenic being able to penetrate seems very doubtful. Sicard and Block, Benedick and others have found traces in the spinal fluid following the intravenous injection of salvarsan; others, including the author, have been uniformly unsuccessful. This discrepancy may be accounted for by the varying state of meningeal irritation of the syphilitic patients who have furnished the material for most of his studies.

As early as 1902 Leri as well as Orefici and Cruchet noted the presence of iodide in the spinal fluid of patients suffering with tubercular meningitis who had previously received iodide by mouth. Rotky also was able to detect bromide in the spinal fluid of a patient suffering with meningitis who had received bromide by mouth for a considerable time. None of these authors were able to find either iodide or bromide in the spinal fluid of normal patients. From these observations it would seem that inflammatory disease of the meninges causes a "let-down" of the barrier separating the blood from the spinal fluid, whether at the choroid or elsewhere. Attempts have also been made to reproduce this state by the introduction of irritating substances into the subarachnoid space, such as cyanide of mercury, horse serum, and homologous serum. Simple drainage of the spinal fluid following salvarsan was advocated in America by Pillsbury. Barbat found arsenic in the spinal fluid following a thorough drainage of subdural space. In a series of 30 cases treated at Lane Hospital the results of this method (salvarsan following drainage) were definitely inferior to the Swift-Ellis treatment, judged by both objective symptoms and the ability to produce a permanently normal spinal fluid.

All of these observations were more thoroughly explained by Flexner and Amos in their work on poliomyelitis. They showed that antibodies and even the virus of the disease might be drawn from the blood serum to the spinal fluid following the introduction of certain irritants into the subarachnoid space. Especially significant was their finding that these irritants might be graded in the order of their potency. Horse serum was found most potent, then heterologous, homologous serum, hypotonic and hypertonic saline solutions, and least irritating of all was drainage of the cerebrospinal spinal fluid.

It is interesting to consider how these newer ideas in spinal pathology have been utilized in our treatments of diseases of the meninges. The intradural methods of Swift-Ellis, Ogilvie, and Byrnes all tend to place the emphasis upon injecting arsenic or mercury, more or less diluted in serum, into the spinal canal. They depend upon diffusion or the circulation of the spinal fluid to bring the injected substance in contact with the pathological lesion. Practically these methods have produced undoubted clinical results, but their success may depend on factors other than those given out by their authors.

The introduction of the patient's own serum into the subarachnoid space produces an irritation manifested by a pleocytosis frequently as high as 1800 cells per cu. mm. Even drainage of 30 to 50 Cc. of spinal fluid may be followed by a mild reaction of 10 to 80 cells. Following the ideas of Flexner and Amos, it seemed possible that this irritation of the choroid would enable drugs

and antibodies to pass into the spinal fluid for a period of thirty-six hours.

In order to secure exact information on this point, Mehrtens attempted to bring sodium iodide from the blood to spinal fluid. This drug was chosen for two reasons: first, because it had been definitely proven by numerous observers including Catton that sodium iodide will not penetrate the normal choroid; secondly, because it can be maintained in the blood in considerable concentration with little distress to the patient.

His technique in brief consisted in injecting 50 grains of sodium iodide in a 10-per-cent solution (according to the formula of Klemperer) intravenously every half-hour for four injections. One hour after the last injection 12 Cc. of spinal fluid was removed, a cystological examination was made, and the fluid was examined for iodine by Mr. C. G. MacArthur of the Pharmacological Department of Stanford University. In these 10 control cases no iodine was found.

In the next group of 8 cases the same routine was followed, except that 10 Cc. of horse serum was injected into the subarachnoid space six hours before the intravenous injections of iodide. The resulting spinal fluids in six cases showed intense irritation in some cases up to 16,000 cells per cu. mm.—in two cases practically no reaction was obtained. Those cases showing the intense reaction gave definite tests for iodine in the spinal fluid. The two cases showing little or no reaction gave negative tests for iodine.

These results would seem to point to the irritation of the meninges as the essential feature in producing the permeability for iodide.

In another series of cases which will be reported in a subsequent communication, Mehrtens is attempting to make a quantitative estimation of the arsenic reaching the spinal fluid from the injection of salvarsan where a preliminary injection of horse serum has been given.

These results while of interest from the standpoint of the particular drugs studied are of more importance when viewed in relation to the general methods of intradural medication. If, by these experiments, it seems evident that by an injection of horse serum the night before, sodium iodide may be made to pass from blood to spinal fluid, why should we not use this simple and direct method in our attack on the spirochete located in the meninges? In other words, if horse serum, or preferably the patient's own serum, were given the night before, time allowed for an aseptic reaction to develop, then salvarsan given intravenously, we could obtain the advantage offered by the introduction of the immune bodies present in the patient's own serum and at the same time secure free communication for the penetration of the drug.

BLOOD-PRESSURE FINDINGS IN DISEASE.

The *Boston Medical and Surgical Journal* of June 20, 1918, states that during the course of the infectious diseases constant blood-pressure readings will, perhaps, give better clues to impending complications than the pulse or the thermometric readings. In pneumonia, it is usually found that when the systolic blood-pressure reading, expressed in millimeters of mercury, does not fall below the pulse-rate, the prognosis is good; when it does, the most active stimulation is necessary to save life. Distinct fall of the blood-pressure during the course of diphtheria is an indication of grave cardiac failure and probably a fatal outcome. In scarlet fever a sudden rise of the blood-pressure indicates renal disturbance, even before the urinary findings make their appearance. In typhoid fever the range of the blood-pressure is usually somewhat lower than obtains otherwise, but a marked and sudden drop indicates hemorrhage, even though the bleeding is not otherwise apparent. Perforation and peritonitis, on the other hand, are usually accompanied by a rise in pressure. Low pressure is characteristic of the course of tuberculosis, but is, in all probability, an indication only of the generally low vitality.

Unless the blood-pressure instrument is constantly used in disease much valuable aid to diagnosis, prognosis, and treatment will be lost.

TREATMENT OF ATAXIA AND PARESIS BY INTRASPINAL INJECTIONS OF MERCURY BICHLORIDE.

McBride makes an enthusiastic report on this subject in the *Southern Medical Journal* for June, 1918. For the last two and a half years he has employed bichloride of mercury intraspinously. Its employment has assured him an agent which is powerful in its germicidal action on the spirochete, and the amount he uses is sufficient to make a fairly strong solution, about 1 to 5000, using a fiftieth of a grain to 100 Cc. of spinal fluid ordinarily found in the spinal canal. This is many times more potent than the one-twenty-fourth to one-sixteenth of a grain of bichloride ordinarily used in constitutional treatment, for if put directly into the blood stream it becomes diluted with from ten to fifteen pounds of blood, and this minute quantity is probably eliminated far more quickly from the blood stream than can be accomplished from the spinal canal.

The technique of this operation as used by him is as follows: One-sixtieth to one-fortieth of a grain of bichloride of mercury, dissolved in 1 to 2 Cc. of distilled water, is introduced into one-half ounce or more of spinal fluid that has been collected from the patient in a glass funnel. One or more cubic centimeters of spinal fluid are discarded before the mixture is made, depending upon the amount of pressure present in the canal as evidenced by the rate of flow through the puncture needle. This bichloride solution should be about 100° F. temperature. The funnel containing the bichloride-laden spinal fluid is attached to the puncture needle by means of a short rubber tube joining this and the funnel. This mixture is allowed to flow into the canal just as in giving any intraspinous injection. Such technique produces a thoroughly spirocheticidal solution.

In from a few minutes to six hours the patient begins to have accentuated those symptoms which have attended the disease. The tabetic who has had lancinating pains has these greatly increased; if he has had a girdle sensation it becomes pronounced; if gastric crises, then stomach symptoms are prominent. The purely tabetic does not become delirious. The paretic has practically none of the above symptoms, but becomes delirious to a greater or less degree in from six to twenty-four hours and will remain so for half to one day, but none of his cases has given alarming symptoms.

Only once in 136 injections on 38 patients has he had to resort to the catheter on account of retention of urine. Otherwise an opiate or coal-tar product has been sufficient for the relief of pain. He finds acetyl salicylic acid most efficient and uses it almost exclusively, following a routine of one-sixth or one-quarter morphine at the time of operation. These patients usually remain in the hospital from two to five days, and are completely recovered from their operation in from six to seven days.

THE VALUE OF RENAL FUNCTIONAL STUDIES IN THE PROGNOSIS AND TREATMENT OF NEPHRITIS.

In the course of an article contributed to the *California State Journal of Medicine* for June, 1918, Hurwitz states that the management of the water balance is of especial importance in acute nephritis and in that type of chronic kidney disease in which vascular irritability and the tendency to polyuria are such striking features. In this type of renal lesion (primary contracted kidney) polyuria is an evidence of a slight or early disturbance of the kidney vessels, and this results in the elimination of a urine having a low specific gravity and a low concentration of salt and nitrogen, even though the ability of the kidney to excrete added salt and nitrogen is not itself disturbed. It is for this reason that in the treatment of chronic nephritis of the arteriolar type Von Noorden has always insisted

on the danger of abusing water. It is to him and his associates that we owe the demonstration that the conventional milk diet for nephritis, while empirically successful, is irrational because of its excessive content of fluid and protein, and that the constant overstimulation of the kidney by so apparently harmless a diuretic as water may entail danger to the integrity of the kidney's vascular functions.

While, therefore, some restriction of fluids may be indicated in every patient with nephritis it is necessary to discriminate not merely in regard to the type of case in which such restriction is indicated, but also the amount of fluids allowable. Whenever there is any doubt, it is well to determine the permeability of the kidney to water, and to measure carefully the fluid intake and output. Such knowledge is especially helpful in the management of patients where edema is absent or at most only very slight. When, however, the kidney is obviously impermeable to water, as shown by the presence of marked edema, the ingestion of fluids above the amounts absolutely necessary to meet the body's needs will only increase the edema.

There is perhaps no one therapeutic measure which has worked such hardship upon nephritic patients as the absolute restriction of salt over long periods of time; and yet there is no simple and more effective weapon in the edematous types of subacute and chronic nephritis. It is common knowledge that a patient with renal edema who has been partaking freely of salt loses rapidly in weight when placed upon a salt-free diet. The abuse of this important therapeutic measure is to be attributed rather to its indiscriminate application to every nephritic without previously ascertaining the permeability of the kidney to salt in the individual instance.

As in the case of fluid restriction, so here also the one essential guide to treatment is the absolute salt balance. Only from a graphic record of daily salt intake and output can one obtain any exact knowledge concerning salt retention. The management of the salt intake in nephritis is analogous to the carbohydrate intake in diabetes. In patients with renal edema, salt ingestion should be kept at a minimum as long as the edema persists. After the absorption of the edema, the ability of the kidneys to eliminate added salt should be tested occasionally, and the intake increased correspondingly as the eliminative power of the kidneys is restored. The exact estimation of the sodium chloride tolerance, or a determination of the ability of the kidney to concentrate salt, makes possible an intelligent adjustment of the salt intake. If this be maintained at a level just below the ability of the kidney to excrete salt, chronic nephritics may be kept free from edema and in a state of comfort over long periods of time.

In some patients with nephritis, especially in those who show clinically high blood-pressure, uremic symptoms and absence of edema, the kidney is unable to eliminate nitrogenous substances. This lowered permeability for the nitrogenous constituents of the urine forbids a high protein ration, for these substances tend to accumulate in the blood, burdening the kidney unduly and indeed affecting the entire organism.

Because of the fear of nitrogen retention clinicians have for the most part played safe and have restricted the ingestion of protein in all types of nephritis. This blind application of a general principle to fit the needs of all patients has, as in the instance of salt restriction, worked unnecessary hardship upon many nephritics. This has doubtless been the case in many with that type of renal impairment with edema and with or without hypertension (chronic parenchymatous nephritis; nephrosis). Such patients, as we now know, show no nitrogen retention, the kidneys having retained their power to eliminate nitrogen. Here the defect is attributable primarily to a salt and water impermeability. Then too we must bear in mind that the nitrogen elimination may be normal in nephritics with hypertension and without edema. Therefore, if we are to carry out a rational dietetic treatment for the individual patient, we must have some knowledge concerning

the ability of the kidney to eliminate not only the ingested fluid and salt but also the nitrogen constituents.

Extreme restriction of protein is advisable only in the acute stages of nephritis, and then only for short periods of time. The withdrawal of protein from metabolism must not be prolonged because the nephritic cannot get along safely upon a smaller amount of protein than a healthy person. If protein is not administered in requisite amounts, the patient will draw upon his body protein.

A safe rule to follow is to restrict the protein to the minimum amount required by the body. A protein intake of one-half or three-fourths of a gramme per kilogramme of body weight is as low a protein intake as is compatible with health. This means that a patient weighing one hundred and fifty pounds should have from forty to fifty grammes of protein a day. Should the severity of the condition warrant a further reduction, it is important to spare the body protein and maintain weight by the liberal addition to the diet of carbohydrates and fats. When on such a diet, the ability of the kidney to eliminate added nitrogen should be tested from time to time. Further additions to the protein of the food may be made from time to time as the excretory function is restored. The weight and health of chronic patients may be satisfactorily maintained by adjusting the protein intake at a point below the eliminative power of the kidneys for the ingested nitrogen.

THE TREATMENT OF LEG ULCERS.

To the *New York Medical Journal* of June 15, 1918, SKILLERN contributes a practical paper bearing this title. He emphasizes the fact that when confronted with an ordinary leg ulcer, due to varicose veins, the cardinal principles of treatment are sterilization of the ulcer and support. Congestion has been termed the first stage of inflammation: to relieve this congestion put the patient at rest in bed and elevate the foot. To sterilize the ulcer smear its surface and recesses with twenty-per-cent solution of dichloramine-T dissolved in chlorcosane and leave the ulcer open, exposed to the air, keeping the bedclothes away from it with a cradle. Over the ulcer itself there may be applied a wide-mesh paraffin mosquito netting. Every twenty-four to forty-eight hours dichloramine-T in five-per-cent solution is applied to the surface of the ulcer. Soon healthy granulations spring from the base of the ulcer and fill its cavity flush with the surface, the degree of sterilization being determined by the bacterial cell count. If the ulcer is large it is now ready for skin-grafting, the best method being that proposed by Steele, in 1870. The grafts on the ulcer are allowed to heal while exposed to the air, being protected from the bedclothes by a basket made of wire netting.

If the sterilized ulcer is small it is best treated by the calomel adhesive plaster method. The ulcer surface is dusted with calomel and covered with strips of adhesive plaster firmly applied from below upward, renewed from two to three times a week.

These strips compress the granulations, preventing their becoming edematous. The strips also promote luxuriant growth of epithelium from the ulcer edge, and it is not long before the ulcer is cured. With this calomel adhesive plaster method there is no reason why the patient should not be up and about.

Most leg ulcers will yield to these simple methods; those that do not yield require additional measures. Sometimes the simple Nussbaum incision suffices. Here a circular cut is made about two centimeters from the margin of the ulcer, the object being to overcome the venous stasis at the edge of the ulcer. The circular incision is closed with interrupted sutures of horse-hair. In other cases the ulcer does not heal because of complications such as underlying osteoperiostitis, syphilis, and cancerous degeneration (Mariolin's ulcer). Excluding syphilis, these complications are dealt with by cleaning up the sores by the sharp spoon and cutting away the mortified skin with scissors, removing all necrotic tissue and all

tissue whose vitality seems diminished, then promoting cicatrization by efficient treatment of the wound.

In certain cases the electric dry-air oven helps: here the limb is baked in a temperature of 250° or 300° F. for from twenty to thirty minutes; the number of treatments averages three a week.

Smits believes that the only modern surgical method of treatment of varicose ulcers that reckons with etiology is local treatment of the ulcer combined with stretching or laceration of the nerve, in the territory of which the ulcer is situated. The following nerves come under consideration for nerve stretching in the neighborhood of the ulcer: (*a*) internal saphenous; (*b*) external popliteal; (*c*) external saphenous. The technique followed in exposing these nerves is the same as that suggested by Chipault.

At times teasing the sciatic nerve into separate fibers must be performed, always selecting the classic spot at the lower border of the gluteus maximus.

Attention must also be directed toward the varicose veins; for routine treatment of the average case, Unna's zinc oxide gelatin paste stocking serves as an admirable and efficient support. When the ulcer is cured the Randolph bandage or silk elastic stocking will be found useful. In suitable cases operation may be performed. The most radical method is that of Madelung—total open excision of the long saphenous vein. This operation is founded on sound principles and gives as much as can be attained by any method of extirpation, cure resulting in eighty per cent of the cases treated by Madelung's method. The varicose perforating vessels may be dealt with by being picked up and tied one by one, after the method of Novaro.

After all, any method of treating leg ulcer is efficient which pays due regard to the fundamental pathological etiology of the lesion. Skillern emphasizes this point in a previous paper, and Smits must have felt very much the same way about the matter, for he says: "The extensive, nearly endless, literature on chronic ulcers of the leg, the laudatory commendations of continually renewed remedies, prove beyond doubt that a passion for using powders and ointments puts us off the track."

THE VALUE OF AMYL NITRITE INHALATIONS IN THE DIAGNOSIS OF MITRAL STENOSIS.

Writing on this topic in the *British Medical Journal* of May 18, 1918, FISHER states that the suggestion made by Dr. Morison that the murmur indicative of the presence of mitral stenosis can be made more evident by causing the patient to inhale amyl nitrite is open to more than one fallacy.

The abnormal sound which is very commonly mistaken for the presystolic murmur of mitral stenosis is the diastolic sound, sometimes part of a reduplicated second sound audible at the apex, sometimes a mid-diastolic sound, or even the third sound of the heart, and it is probable that this sound, when present, would be made more distinct by the inhalation of amyl nitrite.

It is strange how very few, even of well-qualified medical men of considerable experience, are aware of the danger of mistaking the sound in question for a true presystolic murmur—in other words, of the danger of considering it to indicate the presence of mitral stenosis.

Although a sound of this character may be heard over a healthy heart in a healthy person, it is more likely to occur in a person with a low vasomotor tone—that is, one in whom the neuromuscular system of the circulation does not react quickly to the various demands which the movements of the body make upon it. A similar low vasomotor tone is produced by the inhalation of amyl nitrite, and it appears probable that the drug would accentuate a sound which is no indication of disease.

Fisher does not suggest that amyl nitrite may not also render more distinct the true murmur of mitral stenosis. The murmur present in mitral stenosis is, however, one the method of production of which is not evident. Its causation is not, he believes, so simple as Morison seems to think. The morbid anatomy of mitral stenosis presents

other serious changes besides mere narrowing of the mitral orifice. For example, the chordæ tendineæ may be so shortened that they have disappeared and the large flap of the mitral valve is in contact with the apices of the muscular pillars. The action of the left ventricle must thus be hampered and great muscular strain must be brought to bear upon the thickened and shortened mitral flap. What effect has amyl nitrite upon the hampered ventricle, and how is that effect, whatever it may be, to influence the sound which occurs during the ventricle's contraction? He cannot make any suggestion. The trial of amyl nitrite may prove to be interesting, but it does not seem to Fisher that it is likely to give reliable indications as to whether organic disease is present or not. If it does, he would favor the view that amyl nitrite will influence the diastolic sound of a normal heart but not the presystolic murmur of mitral stenosis.

THE TEACHING OF MATERIA MEDICA.

In a symposium on this subject in the *Edinburgh Medical Journal* for June, 1918, STOCKMAN states that at the present time the term materia medica, in their Scottish schools of medicine at least, has come to be merely a conventional and brief name to denote a number of closely allied and interdependent branches of medicine. It is this which has introduced so many difficulties into the teaching. The teacher has to deal with pharmacognosy, pharmacy, prescribing, pharmacology, and therapeutics, and the last involves a certain amount of pathology and clinical medicine, not always of an elementary kind. One cannot teach therapeutics without trenching on these, and it is to be borne in mind that the subject includes not only the remedial action of drugs, but such measures as vaccine and serum therapy, massage, electricity, diet, climate, spas, and mechanotherapy.

The different parts of the subject demand very different degrees of medical training and maturity on the part of the student. For instance, pharmacognosy, pharmacy, and prescription-writing are requisite at an early period of the curriculum; they can easily be learned then, and require very little previous knowledge for their study. A certain limited acquaintance with these subjects is absolutely necessary for the student and practitioner of medicine, but it could quite well be imparted in a short special course by a teacher who has been trained as a chemist and druggist. The most important point, in his opinion, is to settle whether the teacher is to be a pharmacologist with no pretensions to clinical knowledge and practice, or whether he is to be a physician who has had a special training in pharmacology and therapeutics. After a pretty long experience in teaching medical students he has no hesitation about deciding in favor of the latter.

A pharmacologist working in a laboratory as his sole professional occupation soon loses touch with practical therapeutics. What he has to teach is of little interest and importance to medical students or practitioners. Many such pharmacologists have been distinguished physiologists and physiological chemists, but their contributions to therapeutics or practical medicine have been singularly few and unimportant. Their work has mostly been explanatory of the known actions of old and tried remedies, or has systematized and extended our outlook on groups of remedies. Ehrlich may, Stockman knows, be cited as a striking example to the contrary, but the chemical part of Ehrlich's researches on organic arsenic compounds was carried out by a combination of chemists of great experience and ability. It is unlikely that it would be possible to obtain a teacher of pharmacology with sufficient chemical knowledge and skill to repeat or carry on similar researches. Speaking broadly, it seems to him that therapeutics can only be profitably studied on persons who are ill, and hence the teacher should have as wide an experience of this kind as possible. The teaching of a man who is merely a laboratory pharmacologist will lack conviction and real knowledge.

The value of such drugs as iron, arsenic,

mercury, quinine, salicylic acid, potassium iodide, emetine, and many others can only be established in diseased conditions. Their action on healthy men or animals gives no clue whatever to their action in the diseases for which they are all valuable remedies. It is notorious that the laboratory studies of the action of digitalis have misled us as to its true action and its application in treating heart affections. A physician who knows the daily requirements of patients and practitioners, and who is well acquainted by experience with the shortcomings and value of remedies in their actual use, seems to him to be the only possible teacher of therapeutics.

INTRAVENOUS INJECTION IN WOUND SHOCK.

In discussing this topic the *British Medical Journal* of May 18, 1918, states that Bayliss prefers the term wound shock, introduced by Cowell, in a recent report to the Medical Research Committee, to traumatic or surgical shock, and after mentioning the primary shock which serves a useful purpose in diminishing the liability to hemorrhage, devotes his attention to the secondary stage of shock. The immediate cause of the low blood-pressure is still obscure, but several conditions can be excluded—namely, Yandell Henderson's acapnia; Crile's adrenal exhaustion, because adrenalin is present in excess at the onset of shock; exhaustion of the nerve centers, inasmuch as the reflexes are not diminished to any important degree except when the blood-pressure has been low so long that the centers are paralyzed from oxygen want; cardiac failure; and paralysis of the arterioles or veins, especially of the abdomen, because direct observation during laparotomies fails to show any abnormal vascular distention. The explanation most in favor is an accumulation and stasis of blood in the capillaries, so that it is as effectively removed from currency as it would be by bleeding—Cannon's exæmia. With this deficiency of the circulating blood the blood-pressure naturally is low, and as a result the tissues suffer from oxygen starvation, the vasomotor and respiratory centers begin to fail, and being directly dependent on the blood-pressure the excretion of urine and of acid and toxic products falls.

After some discussion Professor Bayliss decides that acidosis, which some observers have regarded as the essential cause of shock, is not a serious factor. This point is important as regards the treatment, for transfusion with sodium bicarbonate has been advocated; but in experimental shock the beneficial results of this remedy have been transient and slight, and this effect may quite well have been due to the volume of fluid introduced. The best means of counteracting the production of acid in the tissues is to increase their supply of oxygen from the blood, and if for other reasons it is necessary to give alkalies the oral route should be adopted.

The light thrown on the treatment of shock is the important feature of the day. The true object in the successful combating of shock—namely, an increased supply of blood and oxygen to the tissues—can be obtained by raising the blood-pressure, but vasoconstrictor drugs cut off the access of blood to the tissues, and are therefore inadvisable. The proper course is to raise the volume of circulating blood and thereby increase the blood-pressure without diminishing the peripheral flow, and for this purpose it has naturally been assumed that transfusion of blood would be the best means. It is therefore surprising to find that experimentally blood is not so superior to a solution of gum arabic as might be anticipated; thus, if a given case fails to respond to gum solution, transfusion of blood is also ineffective. One explanation appears to be that in ordinary conditions there is a sufficient reserve of hemoglobin to keep the tissues provided with oxygen, even with a diluted blood, provided the blood-pressure is not too low and the patient is kept at rest.

The nature and composition of the substitute for blood are important factors; Ringer's solution leaves the vessels in half

an hour or so, and as the blood-pressure then falls to its former level or even lower it is useless; hypertonic solutions of salt also prove valueless, and the addition of calcium salts to Ringer's solution has not improved matters. A colloid with an osmotic pressure is required, and this is provided by a 6-per-cent solution of gum arabic with 0.9 per cent of common salt; it does not leave the blood-vessels or produce any bad effects, such as hemolysis, agglutination, thrombosis, or anaphylaxis; it maintains the blood-pressure indefinitely, and has the great advantage of easy preparation. That physiology applied practically has thus scored a triumph is shown by the report on 250 cases of shock by Hamilton Drummond and Taylor.

In conclusion, Bayliss points out that after very grave hemorrhage transfusion of blood would be preferable; and probably this would also apply in cases in which from repeated small bleedings the reserve of hemoglobin has been brought to a low ebb.

THE ACIDOSIS OF SHOCK AND SUSPENDED CIRCULATION.

Sir Almroth Wright and Colebrook (*Lancet,* June 1, 1918) writing on this subject state that we owe to Crile the suggestion that acid intoxication is an element in surgical shock. For the establishment of the fact we are indebted to Cannon. His observations have shown that we have in the wounded man affected by shock a man suffering from a severe, sometimes an extreme, acidosis. This discovery has therapeutic value; and it is of utility also as directing attention to a fundamentally important element in our vital machinery which has up to now been only very imperfectly explored, and which medicine has, one may say, completely left out of account.

With respect to the acidemia of the wounded man the authors see no room to doubt that it is one into which the factors they have been studying all enter.

As to the nature and genesis of the acid conveyed into the blood we may, in the light of Fletcher's work on the metabolism of muscle in the presence of oxygen and in its absence, conclude that both in their experiments and in shock as seen in the wounded man, they are dealing with an acidemia produced by lactic acid evolved in muscles which are, by reason of arrest or collapse of the circulation, cut off from their oxygen supply. When we think the matter over we see that this would be an acidemia similar in character and derivation to that which develops in the dead body. The conditions which produce chilblains and trench-foot are essentially the same. From this we may safely argue that when acidosis is examined for in these conditions it will be found. And in the meantime in connection with the relation of acidemia to gas gangrene and the data set forth, it is of interest to note that there is in severe trench-foot quite special liability to the development of gas-gangrene infection.

The pathology of trench-foot and that of general anesthesia would seem to lie poles apart; but in reality they seem to have in common the factor of a shutting off of the circulation and a resultant cutting down of oxygen supply from the muscles. This collapse of the circulation will, of course, be specially liable to supervene in severe and prolonged operations, in particular when undertaken in cold operating theaters. Cannon has emphasized the important practical points—the risk of superinducing upon the top of a "wound-shock acidosis" an "anesthesia acidosis;" and the special risk of superinducing asphyxia when administering an anesthetic to an already acidosed patient.

Two years ago one of the writers pointed out that gas gangrene is characterized by the development of an extreme acidosis; and that gas-gangrene patients who are in a state of collapse and quite inoperable can be resuscitated and brought into a condition to stand operation by the intravenous administration of bicarbonate of soda. The utility of this procedure appears now to be established, and the treatment is widely resorted to. There remains, however, the problem of the source of the acidemia. In connection with this it was at one time

suggested that the acid was elaborated by the bacillus of Welch. It has evolved that we must, in addition to acid elaborated by the microbe, take into our reckoning acid elaborated by muscle. In those cases in which gas gangrene develops during or immediately after shock the favoring factor may be acid derived from muscle.

The ideas which have been developing have clearly a direct bearing on the policy to be adopted in the treatment of cases of shock—the warming up of the patient, and the intravenous injection of alkali recommended by Cannon.

With regard to the warming up of the patient there is an important distinction to be established. As a prophylactic measure the giving of hot drinks and the application of warmth is assuredly the ideal procedure; by maintaining the circulation the acidosis will be prevented. No such enthusiastic view can be taken of heat applied as a remedial procedure in fully developed shock. No doubt it is there urgently required for the reëstablishment of the circulation and the breaking of the vicious circle; but inevitably it will convey into the blood stream additional acid, increasing the acidemia. Their experiments upon rabbits subjected to cold immersion have very vividly impressed upon them that too rapid resuscitation by warmth—*i.e.*, a too precipitate washing of muscle acid into the blood—may be perilous to life. They suggest that this possibility should be constantly kept in view in connection with all resuscitation procedures, and not only in those applied to the wounded. It would seem to the writers theoretically desirable, for the avoidance of resuscitation acidemias, wherever possible, to commence procedures by a bicarbonate of soda injection. With respect to the risk of piling up an anesthesia acidosis on the top of a resuscitation acidosis, it is clear that security against this would be only obtainable by ascertaining, before sending the patient on to operation, that his blood alkalinity had returned to the normal. In connection with this the authors point out that the method of measuring the alkalinity of the blood by the method of direct titration in capillary tubes is very easily learned; and that once a sample of serum has been obtained, the testing takes only two or three minutes.

SURGICAL DIATHERMY.

In a brief abstract (*Lancet*, May 4, 1918) CUMBERBATCH explains that the principle of the treatment lies in passing, by means of an electric current, heat to a considerable depth, for the purpose of coagulating the growth *en masse*. The heat of the ordinary cautery does not penetrate deeply enough to be of comparable value, tissue being a bad conductor of heat, but a good conductor of electricity. Experiments on dead pieces of tissue show the results obtained by the two methods, by electrodes or terminals of equal diameter and shape, with the aid of the epidiascope. In diathermy the tissue beneath the active electrode whitened, then bubbles of gas escaped, followed by steam, and subsequently sparks developed. This last manifestation showed that the tissue was now dry and was not conducting the current normally. Accordingly this was the stage at which to stop the application. The effect of diathermy in vascular tissues is less deep, owing to the continual movement of the blood and lymph therein. A needle is the best form of electrode in large growths. It is not desirable to scrape or cut tissues which had been coagulated, as profuse hemorrhage may result from the difficulty of coagulating blood in any vessels larger than capillaries. The best results were obtained by using an active electrode and scalpel, half an inch of the blade being left uninsulated for cutting into the coagulated tissue. Large blood-vessels must not be included in the burning; the periosteum of bone is killed by the current. Diathermy is not followed by shock, and the rise of temperature is only slight, and when it has been applied in the neighborhood of large arteries secondary hemorrhage has occurred. Three patients have died of bronchopneumonia after diathermy. The average number of such accidents after this procedure was

much less than that following ordinary surgical measures. In the malignant growths the best results have been obtained in adherent palate. Of the non-malignant growths, the best results were obtained in papillomata, especially of the bladder, and in nevi.

Patterson, in commenting upon this paper, stated that he knew of five fatal cases of secondary hemorrhage following the procedure.

RHUS DERMATITIS.

TOYAMA'S article embodies an abstract from the Japanese works on this affection, together with a comprehensive survey of the literature of other countries. Of the six varieties of the rhus family that in Japan grow wild, *Rhus toxicodendron* and *Rhus vernicifera* are the most injurious. He notes that the first descriptions of rhus dermatitis came from the Orient from 605 to 609 A. D. in China, and from 923 to 930 A. D. in Japan. The clinical features of rhus dermatitis are well known. The character of the poisonous element has not yet been firmly established. Some have asserted that it is volatile, others that it is non-volatile. Those who hold to the former theory assert that people are poisoned who simply pass under a lacquer tree or in front of a lacquer-ware shop. New lacquered ware has caused a dermatitis in a large number of people, while old lacquered articles are harmless. Maisch, together with other German and Japanese authorities, holds this view. On the other hand, Pfaff, Tschirch and Jadassohn, and others, believe that the toxic agent is non-volatile. The writer's experiments in this direction tend to show that rhus has no volatile poison. Kittens and young rabbits were used, since they have the most susceptible skin of any of the domestic animals. They found that the smoke that is produced by the combustion of lacquer did not inflame a susceptible skin. They seek to explain the common observation that smoke from burning rhus plants is poisonous by the supposition that a non-volatile substance may be carried by the particles of soot in smoke, and this is fortified by an observation that smoke filtered through glass-wool is not poisonous. An interesting circumstance was the finding of an antique jar, which had been buried in the ground about a thousand years ago, in a ruin in Japan. Inside this jar there was Japanese lacquer, quite dried up. Experiments with this lacquer showed that a petroleum-etheric solution was poisonous, although all of the volatile components had naturally been lost during the many years that it had been buried.

A substance named "urushiol" is claimed to be the principal ingredient of rhus. This may be obtained from the sap of the lacquer tree by dissolving in absolute alcohol and evaporating the alcohol from the filtrate of this solution, and this may be further purified. People who are susceptible to rhus poisoning are also susceptible to urushiol, and cats and rabbits which are susceptible to the lacquer are also sensitive to the urushiol. He could find no difference between the urushiol dermatitis and lacquer poisoning, or poisoning from any members of the rhus family, as regards either the symptoms or histological findings. He considered that the principal ingredient of the ivy is the same, both in its clinical character and its poisonous action, as that of the lacquer. He concludes that the cause of rhus dermatitis is urushiol, a principal ingredient of the lacquer, and that this principal ingredient is the toxic agent.

Assuming that urushiol, a non-volatile substance, is the toxic agent, the writer then seeks to explain the cases of infection at a distance. In the case in which the infection is produced by walking under a lacquer tree, he assumes that a small quantity of the sap may be carried to the person by means of the wind, or by insects. Very minute particles of lacquer are sufficient to produce dermatitis in a susceptible skin. The poison may also be conveyed by the pollen. The cases in which poisoning has appeared after passing the front of a lacquer-ware shop may be due to mechanical transportation of the poison. The reason that old lacquer-ware may be harmless depends on the decomposition and recombin-

ing of urushiol with time. Persons may be poisoned by contact with lacquer that has adhered to clothing and wools.

Histologically, he found marked changes connected with the sweat ducts in the papillary layer, as well as about the hair follicles. He assumes that minute particles of urushiol reach the skin and are easily oxidized, this process of oxidation causing a poisonous action. The sweat glands and hair follicles show early changes because they offer a ready means of entrance to the poison.

With regard to treatment, the writer warns against the successive application of various medicaments, especially in ointment form, on account of the danger of spreading the injurious substance before neutralization, on the sound skin. For the neutralization or destruction of the urushiol an alkali, nitric acid, and sugar of lead should be used. If it can be proved that there has been contact with rhus, he recommends, as have others, the preliminary application of an alkali. The surface should be rubbed with cotton wet in a solution of sodium carbonate or potassium carbonate in water, or a one-per-cent solution of caustic potash in alcohol, glycerin, and water. By the action of this alkali the lacquer adhering to the skin appears as spots or lines of blackish color, if the quantity is sufficient. These spots and lines may be removed by the application of an alcoholic solution of one-per-cent nitric acid. Then the skin may be washed with soap and water.—*Boston Medical and Surgical Journal*, May 30, 1918.

SKIN-GRAFTING IN THE TREATMENT OF WAR BURNS.

WAKELY (*Lancet*, May 25, 1918) states that he has used ambrine for over a year for burns of all degrees, and compared with control burns of similar character it has not shown any marked improvement in healing properties or final results. Skin-grafting was often the only means of obtaining a satisfactory final issue. American surgeons do not seem to have obtained any better results in the treatment of burns by paraffin preparations.

For all fourth-degree burns of the extensor surfaces of the hands and wrists, where much contracture has developed, or will take place eventually as a result of healing, the plastic method of a flap from the abdomen should be employed.

The technique is as follows:

A tourniquet is applied below elbow, and whole of contracted surface over back of hand should be excised without opening into tendon sheaths.

An incision is made immediately internal to semilunar line on right side of abdomen when the right hand is to be treated, and *vice versa* in case of left hand. The incision is carried down to anterior layer of rectus sheath, and all tissues superficial to this are undercut for amount required to cover surface to be grafted.

Small openings are made in graft in midline for projection of fingers. The edges of the flap are secured to healthy skin margins of hand by a few interrupted silkworm-gut sutures.

A small drainage-tube is placed at lower corner of incision to allow any oozing to escape freely from raw surfaces.

The arm operated upon is fixed to patient's side by means of adhesive plaster and flannel or crêpe bandages. (This method recommends itself in preference to plaster-of-Paris bandaging because it is light, causes no inconvenience to patient, does not impede circulation, and allows of easy removal if bandage tends to become objectionable owing to sweating, etc.)

The lower portion of flap is separated from its attachment after twelve days; a further six to eight days should be allowed to elapse before upper end is detached from abdominal wall. The area laid bare by abdominal skin excision is closed by undercutting skin all around margin of wound and suturing edges together.

After the usual period of six months following the operation a limited amount of protopathic sensibility can be elicited in flap, and this improves slightly up to one year and then becomes stationary. Patients are well satisfied with the result and the esthetic effect is good.

Scar tissue has occupied the attention of surgeons for some time past, and it is now recognized that a minimum amount of post-operative scar tissue is conducive to the best and most satisfactory result. In the case of burns the nature of the method of healing by granulation tends to produce by its subsequent conversion into closely packed bundles of white connective tissue fibers a maximum of scar-tissue formation. This is most undesirable for the following reasons:

Contraction or depression in the scar, giving rise to marked deformity and impairment of usefulness of part affected.

Keloid formation with its following disfiguring condition in exposed parts and the distressing sensitiveness of the fibroma.

Epithelioma is an unfortunate result apt to occur in untreated scars of long duration or in areas where irritation is excessive.

TECHNIQUE OF INFECTED WOUND CLOSURE.

GURD (*Lancet*, May 25, 1918) after a two-years' experience in a casualty clearing station had placed at his disposal for clinical study by Sir Robert Jones thirty beds that he might attempt modification of wound excision and sterilization upon wounds in which bacterial invasion had become well established.

Infected compound fractures, as seen in the home hospitals, fall more or less naturally into three groups, depending upon degree and virulence of infection, resistance of individual, and length of time since injury. For indicating suitable therapeutic measures cases have been divided as follows:

Acute suppurative cellulitis with slough formation.

Open granulating wounds communicating freely with exposed bone and discharging purulent material in moderate quantities.

More or less quiescent bone inflammation communicating with the surface by means of one or more sinuses.

1. Acute suppurative cellulitis. The treatment has consisted in excision and cleansing of original wound, if not already accomplished. Adequate incision of inflamed area is made, tubes are introduced, and discontinuous instillation with Dakin's solution or eusol employed according to method introduced by Carrel.

Dressings are changed daily, or once in 48 or 72 hours, depending on amount of suppuration. In all more important wounds the first few dressings are best carried out with patient under an anesthetic, so that the tissues may be thoroughly examined and, if necessary, further incisions made, pus pockets evacuated, necrotic material excised, and instillation tubes accurately placed in positions in which they will do most good. Less frequent dressings under an anesthetic have proved more useful than dressings carried out in the ordinary way at shorter intervals.

So soon as necrotic fascia, muscle tissue, etc., have separated or have been excised and profuse suppuration more or less controlled, the treatment is changed. The surface of the wound and the surrounding skin is thoroughly cleansed with soap and water and bathed with spirit. The wound is then dried, an excess of bismuth-iodoform paste (Morison) is placed over the surface and into all pockets and bone cavities. Gauze gently wrung out of liquid paraffin, and containing in its center a mass of B.I.P.P., is placed everywhere in contact with the tissues.

This is substantially the technique suggested by Morison with the addition of the paraffin-gauze pack. This was commenced with the view of inducing the bismuth-iodoform mixture to insinuate itself into all interstices of the wound, and appears to have proved its usefulness.

Wounds so treated, even though they have been previously discharging freely, do not require dressing more often than once in five to fifteen days. Pain in injured limb and marked constitutional evidence of infection indicates necessity of further interference. Even though there be moderate staining through the dressings, the wound need not be disturbed as the dressings do not tend to become foul, nor do proliferat-

ing granulations tend to invade, or become adherent to, the paraffined gauze.

In several cases it has been found useful in phlegmonous wounds receiving Carrel-Dakin instillations to protect portions of wound less severely infected by means of a B.I.P.P. paraffin gauze pack.

2. Wounds so treated have now been transferred into members of Group II. As soon as the infectious process has become localized, as evidenced by absence of surrounding zone of edema and hyperemia, an effort is made to approximate the tissues and skin edges, and so minimize the ultimate formation of new tissues with its accompanying sequelæ of adherent scars and nutritional disturbances.

This is done by insertion of mattress sutures of heavy silk (No. 12-16) smeared with B.I.P.P. and protected by small rubber tubes or buttons. These sutures are placed 2 to 4 cm. from the edge of wound and drawn sufficiently tightly to put continuous traction on the tissues. They should cross the wound over paraffin-gauze pack. The wound is dressed with spirit or Dakin's solution.

At each dressing, at six to twelve days' intervals, new sutures are inserted and the tissues in this way gradually approximated. As the skin edges approach one another the skin is undercut in order to avoid invagination of scar.

In certain cases with marked loss of tissue complete approximation of integument will be found impossible. It is, however, surprising the breadth of wound surface which can be obliterated in this way.

At each dressing the bone ends are carefully palpated and the B.I.P.P. pack brought to accurate contact with bare bone. All loose white bone fragments are removed and bone ends which are not covered with granulations within six weeks from time of injury are nibbled away until healthy bone is encountered.

The treatment of the wound should be such that the opening in soft tissues should remain somewhat larger than the affected bone area until the bone ends are covered with granulations.

Once the bone is obscured by velvety granulations, the granulation tissue and as much as is deemed advisable of the scar tissue which has formed in the soft tissues is excised and the wound tightly closed by means of superimposed layers of mattress sutures after B.I.P.P. has been carefully applied to the surface.

3. In the third class of case—namely, compound fractures in which the inflammation is limited to one or more discharging sinuses—the author suggests a more aggressive method of treatment than is commonly employed. If the technique outlined above be followed sinuses will be less frequent, since the two chief causes of sinus formation, dead bone forming a nidus for bacterial proliferation, and invaginated epithelium, are combated at the outset.

In the treatment of sinuses the author wishes to emphasize the value of passive hyperemia. A comparatively large number of cases will heal promptly and permanently if meddlesome packing with inert gauze is discontinued and passive hyperemia employed.

In that large group of cases which do not so respond and in which operation is indicated, the safety of such interference may be assumed and the resistance of the individual increased by means of the proper use of a Martin bandage.

Commence cautiously if the inflammatory process is, or has recently been, acute, with application of gentle pressure for five minutes. If no reaction follows pressure is increased and the period of application lengthened until the limb receives treatment for thirty minutes two or three times daily. In this way the resistance of the individual is built up and his tissues prepared for operation.

As a working rule the author believes it correct to assume that any patient in whom induction of passive hyperemia in an infected limb for two periods of thirty minutes in one day is not followed by a febrile reaction of more than 99.4 is a suitable subject for surgical interference. If no reaction follows the hyperemia operation may be undertaken at once; should the

patient react to 99.4 a period of five or six days without hyperemia should be allowed to elapse before operation is undertaken. Should the reaction be above 99.4 only minimal interference should be carried out.

Operation in this group of cases consists in excision en masse of as much scar tissue as may be possible and still permit of closure of wound edges.

A wedge of tissue is excised down to surface of bone. Hemorrhage is arrested by packing and hot salt solution. The affected bone area is exposed and examined if possible by direct vision. Free and fixed sequestra are sought for and removed. Dead bone, not in form of sequestra, is nibbled away.

If exposure of bone has been sufficiently good to justify belief that no dead bone has been overlooked, and if the tissues can be easily approximated, the wound is treated according to Morison's technique and closed by mattress sutures in layers.

In perhaps the majority of cases either bleeding has interfered with proper vision so that examination of bone is impossible, or the wound edges are not easily approximated. In such cases the following technique has been employed:

The exposed bone and soft tissues are mopped with alcohol and an excess of B. I. P. P. applied. Paraffin gauze packs are pressed into position and the wound closed, as completely as may be, by means of protected mattress sutures.

Such wounds are not dressed. At the end of five to ten days the patient is anesthetized, and sutures and packs are removed. The wound surface is found clean, bright-red in color, and covered with fresh firm granulations. The affected bone is now easily examined, there is no bleeding, and further interference is more readily carried out. The whole wound is again dried, "rebipped," and closed by mattress sutures in layers.

In the present series of cases, eight were closed at the first operation, seven in two stages, and seven in three stages. One case of attempted closure in two stages proved a failure.

As Morison pointed out in his original paper, frequent dressings after closure are unnecessary and are harmful, inasmuch as the blood which exudes immediately following operation stiffens the dressing gauze and forms an excellent splint conforming accurately to the part. Satures should be left in position if possible for three weeks, although occasionally some cut out and are better removed.

The author believes that a more aggressive and direct method of treatment of infected compound fractures than is commonly employed in the home hospitals is indicated. The techniques introduced by Rutherford Morison and Carrel, when properly employed, have each proved their usefulness in the hospitals of France. In a series of 30 characteristic cases the author has applied a modification and combination of these methods with gratifying results. The method here described has shown itself to be safe, not difficult to carry out, and has been followed by satisfactory results in a large proportion of cases.

The advantages of any method such as the one described in this paper are many, and are of importance to the patient, the Army Medical Service, the army, and to the economic standing of the country, and it gives a feeling of satisfaction to the surgeon. The advantages claimed are:

Lessening of discomfort and pain to the patient as a result of increase in interval between dressings and shortening of open wound period.

Improvement in functional result in consequence of (*a*) less frequent disturbance of bone fragments during the dressing stage and the earlier application of complete immobilization in cases in which this is indicated. (*b*) A diminution in the number of adherent painful scars and nutritional disturbances. (*c*) Earlier opportunity for secondary operations, such as nerve and tendon suture and massage, etc.

Early transformation of patients from the "dressing" to "observation" class of men.

Shortening of hospital days per patient and consequent increase in the usefulness of hospital beds.

Economy of dressing material, both by reason of the infrequency of dressings and by shortening of the dressing period.

RADICAL CURE OF BUNION.

DEAVOR (*American Journal of Surgery*, July, 1918) thus describes a technique for the treatment of bunion:

A linear-shaped skin-flap, rounded in front, with base posterior, is first turned back, beginning slightly beyond the line of articulation. Next, an area of subcutaneous tissue, similar in shape, with base anterior, and large enough to fully line the proposed joint, is carefully carved out, so as to avoid the underlying structures. On reaching the joint, it is desirable to leave a collar of fascia, extending around the exposed inner portion of the neck of the metatarsal bone. The joint is then opened, and a part of the head of the bone removed with a Gigli saw. The reamer is now applied at various angles, until all superfluous bone is removed, smoothing and rounding the head in a most artistic manner, back to the ring of fascia. The depression in the base of the phalanx may sometimes need to be deepened to receive the newly formed head. At this juncture, the subcutaneous flap is carried into the joint, and fixed with fine catgut, so that the bony surfaces will always remain effectually separated from each other. The collar of fascia is now stitched, under considerable tension, to the interarticular structure, along the line at which it curves to enter the joint cavity. This completely closes the articulation, and serves as a check ligament against future adduction of the toe. The wound is closed without drainage. If infection should arise, there will be limitation of joint action.

After the third day gentle passive motion is begun, and continued daily until healing is completed and satisfactory. The patient may be up in ten days; wear a soft shoe four days later; and resume her usual activities in five to six weeks. Not until several months have elapsed, however, will the entire foot come into possession of its former elasticity.

Arthroplasty for bunion is one of the most delicate operations the surgeon is called upon to perform. It presupposes a clear conception of all the active principles entering into the normal articulation, as well as the one which is to take its place. And, when properly done, it will so transform the appearance of these unsightly extremities as to call forth unsolicited comment from the most casual observer.

TREATMENT OF PSEUDARTHROSIS.

In the final sections of the conclusions of the Inter-Allied Surgical Congress at Val de Grace from March 11 to 16 (*British Medical Journal*, May 11, 1918) are found the following suggestions concerning pseudarthrosis:

The unavoidable cause of false joints in war fractures is the primary destruction of a part of the diaphysis. The other causes which actually have to be taken into account are infection, excessive removal of splinters of bone, and bad reduction, and these ought to disappear. A certain number of false joints can be avoided by sterilization of the seat of fracture, prudent removal of fragments of bone, good reduction carefully supervised, and in certain well-defined cases by immediate or early fixation of the bones.

Save in exceptional cases, false joints should only be operated upon after a considerable interval, when the skin wound is completely cicatrized and when clinically the inflammatory process appears to have ceased. The existence of buried organisms should be investigated by all means at our disposal, such as forcible active and passive movements, elastic bands, vigorous massage, etc.

The following note is added at the request of Sir Arbuthnot Lane:

In cases in which the lower end of the femur, or the upper end of the tibia, or both, are removed the treatment may differ according to the occupation of the wounded man. In workmen an attempt should be made to obtain ankylosis between the femur and tibia either directly or by means of a graft; in men following sedentary occupa-

tions a false joint fixed by an apparatus which permits of flexion may be more advantageous. Either of these two conditions is preferable to amputation of the thigh and an artificial limb. In a case in which there has been extensive loss of substance of the lower end of the humerus, the elbow being intact, it is often desirable to obtain a false joint permitting flexion between the humerus and its shattered lower end, leaving rotation to be produced at the radio-humeral articulation. This condition is more useful and permanent than that given by resection of the elbow.

From the point of view of treatment two conditions are to be distinguished: In simple false joints and in certain examples of false joints with loss of substance in the part of a limb containing only a single bone, it is possible, after freshening the bone in the manner that pathological anatomy suggests, to unite the bones by a metal plate. The best method appears to be fixation with a metal plate, using screws, the screws being placed as far as possible from the false joint. The combination of the use of the metal plate and of an osteoperiosteal graft has given very good results. A false joint with loss of bony substance usually requires a bony or osteoperiosteal graft.

Perfect asepsis, complete excision of the fibrous tissue which surrounds the fragments and of any diseased portions of the bones, are conditions indispensable to success.

ROENTGEN-RAY OBSERVATION OF THE APPENDIX, WITH SPECIAL REFERENCE TO TECHNIQUE.

HOWARD (*Interstate Medical Journal*, June, 1918) notes that the profession, for an indefinite period of time, has endeavored to minimize the errors in diagnosing pathology of the appendix, and especially chronic appendicitis and its complications. The Roentgen-ray examination of the terminal ileum region has, to a great extent, eliminated some of the possible errors of diagnosis.

When it is considered advisable to give a barium meal in acute appendicitis, fluoroscopic examination of the patient will visualize the ileocecal region, as to location and points of tenderness, whether near the appendix base or not. The appendix is not visualized in acute appendicitis if sufficient inflammation exists to obstruct the lumen, and only that portion not obstructed, adjacent to its base, may be visualized.

Drs. Georg and Leonard, who have not yet been surpassed in the literature on the roentgenology of the gastrointestinal tract, make this statement: "We claim that out of a meal of buttermilk and barium, in every instance, unless the lumen has been obliterated, the appendix will fill and it will remain so long enough to be demonstrated on the roentgen plate or roentgenoscope. To this statement, we believe, there is no exception."

Chronic appendicitis may be shown by:

Absence of the appendix shadow; abnormal conditions of position, shape, and size of lumen; concretions; tender point; adhesions.

To repeat, every normal appendix will show on the plate. Without history of appendectomy, an absence of the appendix shadow means either that its lumen has been at least partially obliterated by old inflammation, or is obstructed by a possible kink, or it may be so filled with mucus or concretion that the barium cannot enter. It is conceivable that an acute inflammation could so congest the walls that the lumen would be obliterated. In any case the appendix is pathological. This is all the more certain if, with the roentgenoscope, tenderness is elicited over the appendix area.

A retrocecal appendix should be regarded with suspicion. However, it is believed that a normal appendix may occupy this position, but it will be freely movable. A retrocecal appendix that is fixed is, nine cases out of ten, pathological.

In every stomach Roentgen examination the ileocecal region should be examined. The appendix region should be fluoroscoped, and roentgenograms taken if indicated, whenever a differential diagnosis is suggested.

When chronic appendicitis is suspected,

Roentgen examination should be made before operation.

When the appendix fails to fill with the buttermilk meal, we must conclude it is abnormal.

Roentgen examination of the right iliac fossa will often clear up the cause of constipation, autointoxication, nerve irritability, and some types of stomach irregularity.

INTERLOBAR EMPYEMA AND OTHER SURGICAL COMPLICATIONS OF THE THORAX.

BROADBENT (*British Medical Journal*, May 11, 1918) observes that empyema is the commonest complication in the thorax needing surgical treatment. In most cases it is quite easy to diagnose, as it occurs after pneumonia; an increasing rise of evening temperature, with morning remissions, and dulness and silence at the base of the lung, with displacement of the heart, pointing definitely to it; but, in quite a number of cases, matters are not so simple.

In rare instances there is no history of pneumonia. This is more common in poor children with bad mothers.

In an adult it is very rare. Difficulties may occur from the situation of an empyema; it is not altogether uncommon between the lobes of the lungs, where it is often undiagnosed. If untreated such an empyema may burst into a bronchus, and after weeks of coughing, sometimes of fetid sputum, may clear up, or chronic bronchiectasis may result.

When much pus collects in an interlobar fissure the lower lobe of the lung is so compressed that it becomes dull and airless, leading to the belief that there is an ordinary empyema, until exploration in the usual areas finds no pus.

The characteristic of interlobar empyema appears to be a very dull band, either in the second and third spaces in front or just below the spine of the scapula behind. As a rule, there is much diminished resonance over the lower part of the chest, but not the flat dulness of the band of fluid, and breath sounds are very weak and usually absent at the base. The best place to insert a needle is the second or third space in the anterior axillary region, with the arm extended above the head.

A very rare position for an empyema is between the mediastinum and the lung. A subphrenic gas-containing abscess under the left wing of the diaphragm is caused by perforation of a gastric or duodenal ulcer with a slow leak of the stomach contents, so slow that there is often no history pointing to ulcer. The abscess is limited below by adhesions of the great omentum and the front of the stomach to the abdominal wall, to the left by the spleen and gastrosplenic omentum. On the right it is bounded by the falciform ligament of the liver, which, as the abscess enlarges, is pushed very much to the right of its normal position, even to the right nipple line, as in the first case described. Abscess under the right wing of the diaphragm is much rarer, and is more usually due to inflammation of a retrocolic appendix causing an abscess communicating with the colon than to a perforated duodenal ulcer. Its boundaries are by adhesions of the edge of the liver, the transverse colon, and the omentum to the abdominal wall, the mesocolon, and the falciform ligament, which in this case is pushed well over to the left of the middle line. The gas evolved in these foul abscesses makes the area over them tympanitic, and the bell note is heard on the use of two coins.

The pressure upward of the diaphragm and the inflammation invariably cause changes at the base of the lung. With gastric ulcer it is the left lung which is affected; with duodenal ulcer sometimes the left and sometimes the right. At first a pleural friction is very often heard over the lower part of the lung, usually at the back, but sometimes in front as high as the fifth rib. In a case of perforated duodenal ulcer where there was no vomiting, this friction over the right lower front led to a few hours' hesitation as to whether it was only a case of diaphragmatic pleurisy, but commencing loss of liver dulness soon settled the diagnosis. The friction is

usually followed by adhesion of the pleural surfaces and progressive collapse of the lung, or by a low form of pneumonia. In a few cases there is a clear pleural effusion, and instances have occurred where, a needle having been inserted and clear fluid withdrawn, an accidental push of the needle has sent it through the diaphragm, and the clear fluid has been followed by pus. For some reason it is very rare indeed for pus to form above the diaphragm in these cases. The usual condition is for the lower half of the back of the left chest to become quite dull and silent. The temperature is hectic and suggestive of empyema, and the left base is suspected. But, on examining the heart, instead of finding it displaced to the right, its apex beat will be found external to the left nipple and up in the fourth space, owing to the pushing up of the diaphragm, and there will be a large tympanitic area from the fourth rib downward.

THE TREATMENT OF GONOCOCCUS INFECTIONS WITH SILVER IODIDE.

CERF (*Urologic and Cutaneous Review*, July, 1918) believes that silver iodide is the best agent against gonococcal infection on the basis of a three and a half years' experience with two hundred and fifty cases, using a concentrated solution of silver iodide containing one hundred grains of the silver salt to the ounce. This concentrated solution is very stable, showing no precipitate or deterioration under ordinary conditions of room light and temperature. On adding this solution to tap or distilled water in any proportion the silver iodide comes down, at once, as a very fine, light yellow, flocculent precipitate, which does not cake or become granular on sedimentation and does not develop irritating properties on standing under like conditions.

A substance in suspension when injected into the urethra deposits on the urethra and so remains in actual and continuous contact with the infected area. Silver iodide sediments very rapidly from suspension.

Practical and clean to use, almost non-irritating, the aqueous suspension of silver iodide has the physicochemical properties to make it an ideal topical medicament for the male urethra. When used in the proper strength it will cure gonococcus infection more certainly and quickly than any other local application. Cured when the function of urination, sexual cohabitation and procreation can be fulfilled by the patient under the usual conditions of his every-day life, without discomfort and return of symptoms actually requiring medical treatment. (Product supplied by Department Experimental Medicine of Parke, Davis & Co.)

To determine that a patient is in such condition make microscopic examination of specimens obtained by prostatic massage; culture these specimens; make microscopic examination of stained specimens of shreds from urine, and also culture these specimens; make miroscopic examination of specimens from centrifugated urine. When the findings of these examinations are negative continue only such treatment as will insure the patient's regular return for another four weeks. This is more effective in holding a patient for observation than formal discontinuance of treatment and discharge with request for return for observation.

In the first fifteen months with silver iodide 38 cases, acute and chronic, were treated in direct comparison with an equal number of cases treated with other silver preparations. During this time the author noted that the patients treated with silver iodide were better pleased, complained of less trouble in carrying out their own treatment, complained of less pain and discomfort generally, improved more promptly in every way, gonococci disappeared more rapidly, discharge lessened more promptly. Also, this substance proved a direct check on how well the patient was applying his own treatment—as the stained smears show by the presence or absence of the silver precipitate whether or not the patient is using his injection according to instructions.

In cases requiring deep instillation even with strong suspensions (1 in 4 or 5) there was very little if any pain. And when it

occurred it was of very short duration, never over one to three minutes. Tenesmus seldom occurs, and when it does it is of mild type, rarely lasting over five minutes.

The distressing effects of one-fourth to five-per-cent solution of silver nitrate by instillation, or 5- to 20-per-cent solution of silver nitrate by direct application, are many times more severe and longer in duration—and the good accomplished by the iodide is much greater and more prompt.

Cerf's technique is as follows: In concentrated solution (100 grains to ounce), undiluted for direct application: to urethral ulcers, to prostatic urethra after massage, in periurethral abscess, in inguinal bubo after drainage, and in urethral fistula, in which condition it has given truly remarkable results in three cases of long standing.

In suspension, 1 part conc. sol., 3 parts of water, 1 in 4: For deep instillation with syringe. Make this suspension in a 30-mil graduate, using 4 mils concentrated solution plus 12 mils distilled water. Stir well, take up 4 mils of this suspension in a 10-mil all-glass syringe, allow 30 seconds sedimentation in the syringe with the tip pointing down, standing in the gradute, then inject through a Guyon catheter.

This heavy suspension has shown no tendency to cause irritation, pain, or bleeding by becoming granular or sandy in the urethra after instillation or injection.

In suspension, 1 part concentrated solution plus 7 parts of distilled water, 1 in 8: For hand injection by the patient with an 8-mil all-glass syringe; use every six hours; retain one minute. Use always at bedtime if previous injection was made one hour or longer before.

It can readily be seen, considering the rapid sedimentation, that even a bungling, inexperienced patient will succeed in medicating his anterior urethra even if most of the silver iodide suspension escapes while being injected into the urethra; because the suspended silver iodide coats over the urethra almost immediately, and this coating will remain until the next urination, some of it after the second urination.

In suspension, 1 part concentrated solution plus 159 parts of water, 1 in 16, for irrigation. Increase conc. sol. 1 part each day until 8 parts in 160 are being used by the eighth day. If after this the irrigation is to be continued for a number of times go back to the 1-in-160 dilution. Usually, by this time, improvement is so decided in the ordinary case that irrigation may be discontinued.

Silver iodide is quite stable in solution or suspension under ordinary conditions. It is clean and practical to use, by both physician and patient, and is almost non-irritating. It has the physical and chemical properties making it an effective and practical medicament for topical use in any part of the genito-urinary tract.

PRACTICAL PREVENTION OF VENEREAL DISEASES IN THE MALE.

Ross (*Urologic and Cutaneous Review*, July, 1918) writing on this subject observes that if the men were given the mercurial ointment in a tube to take with them when leaving quarters and told to wash the whole external genital region with soap and water or antiseptic solutions after intercourse, then to urinate and finally rub the ointment into the same places, smearing a small amount into the meatus, but not necessarily into the urethra (it must be remembered that the underwear and trousers should be kept away from the regions until after the whole of the preventive measures are taken, and if the underwear has already been soiled by secretions it should be washed and cleansed with the same agents), upon their return to quarters the unnecessary urethral injection could be taken, if the "powers that be" deem it advisable.

Professional prostitutes should be made (under an imprisonment penalty) to see that every soldier uses the wash and ointment.

For the men who visit women and girls not exactly professional prostitutes but more of the enthusiastic amateur type, there is more of a problem to contend with.

This type generally sell or give away their wares in parks, fields, vacant lots, or rooms

without running water, and some fluid must be used to cleanse off the excess of soiled material enmeshed in the hairs of the genital regions.

For this purpose, alcohol—grain, wood (denatured), whisky, brandy — alcoholic liquid soaps, tooth or mouth washes, vinegar, beer, soda water, gasoline, etc., may be used, and then the ointment applied, after urination. If, from the nature of the "terrain," it is impossible to wash or cleanse them, the ointment must be used alone, and then as soon afterward as possible the parts should be washed and ointment reapplied.

A PRACTICAL CONSIDERATION OF URETHRAL STRICTURE.

MARTIN (*Urologic and Cutaneous Review*, July, 1918) observes that the first preliminary in attempting to pass a filiform through a very tight stricture should be anesthetization and thorough lubrication, novocaine for the former and olive oil for the latter purpose being best. Several filiforms with variously bent tips, such as in the form of a spiral, bayonet, at an obtuse angle, etc., should be gently introduced down to the stricture. Manipulation and patience will almost invariably succeed in passing one of them through.

After convincing oneself that the instrument is through the stricture and has not doubled upon itself or engaged in a false passage, it should be tied in. A spiral-shaped or bayonet-shaped filiform will more frequently find the opening in a tortuous area than a straight-tipped filiform.

If after repeated trials the stricture is found to be not dilated or is resilient and quickly recontracts, then one should think of surgical intervention. In the vast majority of cases, however, dilatation is possible and should be continued up to 26 French. A canal that easily takes a 26 French instrument and does not recontract shortly after the passage of the instrument has been sufficiently dilated, and one may know that it is quite capable of performing its normal function. So much can be accomplished by gentleness, patience, thorough lubrication and anesthesia of the canal, that but rarely in private practice is a cutting operation indicated.

After the canal has been dilated to French 26 or 28 the patient may be dismissed to return in ten days or two weeks. If the canal retains the caliber gained, the next séance may be postponed for a month. Thereafter instruments should be passed at intervals of two or three months, and under no circumstances should tbe period of non-instrumentation be longer than six months. The patient must be impressed with the importance of having dilatation performed several times a year during the rest of his life. A stricture patient should never consider himself cured.

Although, following internal urethrotomy in stricture uncomplicated by perineal fistulæ or abscesses, drainage may be effected by means of a good-sized catheter introduced through the canal, yet to guard against infection, urinary infiltration, and the better to take care of obstinate hemorrhage, it is wise to drain the bladder through a tube introduced through a small perineal opening. This will largely reduce the possibility and gravity of the above mentioned accidents of urethrotomy. Ordinarily the hemorrhage following the cut of a Maisonneuve urethrotome is without moment and easily controlled through the pressure exerted by the drainage tube. In one instance, however, the hemorrhage was very alarming and was controlled only by forcing through the perineal opening a very large tube which exerted marked pressure within the cut canal.

Of operative cases there is not one in fifty that has to be done without a guide. The use of the Maisonneuve urethrotome practically obviates the necessity for this, at times, formidable operation. One may accept as an axiom that any urethral canal that permits urine to come through may always be entered with a filiform, and patience and manual dexterity will practically always enable one to get the same instrument through in complete retention. Hot baths, complete evacuation of the bowels, thorough lubrication, and an assort-

ment of filiforms of various forms, coupled with gentleness, patience, and skill, in the vast majority of instances obviate any need of external urethrotomy without a guide.

In conclusion the author emphasizes these facts:

Moderate and well-executed treatment of gonorrhea is prophylactic of stricture.

Easily 95 per cent of strictures may be treated by dilatation.

Gentleness and deftness are absolutely essential in their management.

Thorough anesthesia and lubrication, coupled with patience, succeed in most "impassable" strictures.

Undilatable and resilient strictures, and urinary infiltration, abscesses and fistulæ demand urethrotomy.

Where urethrotomy is held necessary, the combined internal and external operation, employing the Maisonneuve urethrotome for the former purpose, is best.

Any stricture that will permit the passage of a filiform may be subjected to an internal urethrotomy with the Maisonneuve.

External urethrotomy without a guide is very, very rarely necessary.

In no other department of surgery is there greater need for skill, experience, and thorough training than in this.

Let a urethrotomy be done only when simpler measures fail, and let a trained urologist be judge.

SKIN LESIONS PRODUCED BY MUSTARD GAS.

WARTHIN and WELLER (*Journal of Laboratory and Clinical Medicine*) have carried out experiments on the action of mustard gas (dichlorethylsulphide) on the skin. They describe the pathological changes produced and summarize their findings as follows:

Mustard gas is an escharotic, specific in its action upon the epidermis and tissues of the corium, particularly upon the endothelium of the vessels.

The lesion is a chemical burn unlike that produced by heat, electricity, or the ordinary corrosives such as sulphuric, nitric, and hydrochloric acids or strong alkalies. Of all these agents the effects are most closely allied to those of hydrochloric acid, but are much greater in intensity. It differs from a heat burn in the absence of thrombosis, in the greater degree of fluid exudation, in the greater moistness of the affected area, and in the fact that the necrosis as shown by the loss of nuclei requires hours, or even days, for its complete development. The coagulated, shrunken, and cooked appearance of the tissues in heat burns is not apparent in the tissues in mustard-gas burns.

The vessels in the affected area are severely damaged and collapsed, and there is a local anemia in the earlier stages with a marked fluid exudation and leucocyte migration. The process is non-hemorrhagic and non-thrombosing.

In man the necrosis of the epidermis is usually evident in two hours through the hydropic change in the epithelium and early vesicular formation. There is no deep edema. It is confined to the epidermis and to the papillary layer in the early stages.

In animals the intense and deep edema is most striking and altogether different from that seen in man. Vesicular formation was noted in animals.

The deep penetration of the smallest quantities applied to the surface is a most striking feature. There is an undoubted entrance through the hair follicles, sebaceous and sweat glands.

The slowly progressive character of the necrosis is a specific characteristic, the height of the necrosis being reached five to ten days after application. This may, in part, be explained by the edema and degeneration of the nerve endings in the affected portion.

The admixture of water does not increase the escharotic action, but if the oil is immediately washed away the lesion is greatly reduced in intensity. Washing within two minutes with tincture of green soap may entirely prevent the lesion or result in only a slight hyperemia.

The lesions observed in the axilla, between the fingers, between the toes, around the genitals and between the thighs of men

gassed in action are probably due to the greater moisture of these parts from perspiration and the resulting re-solution of the gas.

The slow healing is probably chiefly due to the vessel injury and the relatively slight leucocytic demarcating infiltration. In this respect the lesion is strongly like an *x*-ray burn of the skin.

OBSERVATIONS ON OCULAR SYPHILIS.

SIMPSON (*Urologic and Cutaneous Review*, July, 1918) notes that the transmission of syphilis (to the eye) appears to take place most frequently by kissing, and in small children also by the practice which many nurses have of moistening the agglutinated edges of the lids with saliva in order to open them. In some countries it is the custom to remove foreign bodies from the conjunctival sac by "licking them out" with the tongue. Occasionally, also, syphilitic ulcers have been observed which were produced by the breaking down of gummata of the conjunctiva.

Conjunctival chancre may so closely resemble chalazion or hordeolum as to cause considerable diagnostic confusion.

The greatest variety of ocular manifestations occur during the so-called secondary and tertiary stages of luetic infection. And, as already intimated, any portion of the ocular apparatus may be implicated at one time or another during the course of the disease. In any case ocular involvement may be either unilateral or bilateral.

Contrary to ideas formerly prevailing, interstitial keratitis may occur during the course of acquired syphilis, numerous typical examples having been recorded. The entire thickness of the cornea is usually involved in the inflammatory process, with haziness and increased vascularization; ulceration rarely supervenes. The so-called punctate keratitis is sometimes later noted.

Iritis is one of the most frequent ocular lesions due to acquired syphilis. In type it may be either serous or plastic; and its development may be early (iritis papulosa) or late (iritis gummosa). The iris becomes congested, nodular, and thickened; ciliary injection is usually marked; exudation occurs into the anterior chamber; synechiæ often follow the plastic type.

Cyclitis usually occurs in association with iritis (iridocyclitis), but may develop independently. It may present characteristics of the plastic, serous, or gummatous type. Ciliary nodulation is commonly observed; the nodules may extend through the sclera, producing perforation and atrophy of the eyeball.

Choroiditis is a common luetic manifestation which may occur alone or with retinitis. Yellowish-white exudate placques are usually first seen; absorption later occurs, followed by local pigmentation and sometimes atrophy of the choroid. Vision becomes markedly impaired if the macular region is implicated.

Retinitis may develop independently or as an extension from the choroid. In type it may be simple, exudative, or hemorrhagic. An exceedingly rare form, the so-called "central recurring retinitis of von Graefe," has also been described. In all varieties of retinitis the acuity of vision is much reduced, the visual field contracted, and the outline of visible objects distorted. Exudation, pigmentation, opacities, and hemorrhages are commonly observed.

Optic neuritis may be an essential luetic sign.

The optic nerve may be attacked by the syphilitic affection directly; in other cases it becomes affected indirectly, owing to the development in the cranial cavity or in the orbit of inflammation or of tumors which result from syphilis, and which secondarily implicate the optic nerve. Optic nerve atrophy may follow the neuritis or may occur primarily. Diminution of vision is progressive, and there is an ever-increasing restriction of the visual field.

It has been claimed that in over fifty per cent of instances paralysis of the external ocular muscles may be correctly attributed to syphilis. Paralysis is usually, but not always, one of the late manifestations of syphilis. The oculomotor nerve is

the one most frequently affected. In paralysis of the ocular muscles double vision, strabismus, vertigo and limitation of ocular movement constitute a distressing clinical picture. Total ophthalmoplegia is the most logical ultimate outcome in the majority of instances.

Tarsitis of syphilitic origin has been described as a late manifestation. It is usually bilateral and develops gradually without appreciable pain. Swelling of the tarsus may become so extensive that the lid cannot be everted. It is essentially a gummatous infiltration.

To the view that interstitial keratitis may result from toxins produced by the spirochetæ elsewhere in the body, the death blow appears to have been given by recent experiments by Stargardt, who found that blood containing trypanosomes injected into the limbus, aqueous, or vitreous of rabbits or guinea-pigs, induced in many instances interstitial keratitis, and a similar result followed the injection of pure trypanosomes. On the contrary, no inflammation of the cornea followed the injection of the toxins of trypanosomes or the dead trypanosomes themselves.

That the spirochetæ pallida may exist in the unaffected cornea of syphilitic fetuses and babies, as well as in some other parts of the eye, has been shown by various writers. The organisms or their "granules" appear to remain latent and to produce no symptoms, probably owing to the peculiar circulatory condition of the cornea. Then, in response to some known or unknown factor they become active and multiply, and clinically interstitial keratitis results.

Stephenson states the histological changes found in interstitial keratitis are essentially gummatous in character, and it is probable the more severe cases are accompanied by similar alterations in anterior parts of the uveal tract. The salient feature, when examined under the microscope, is infiltration of the deeper corneal layers with round cells, and giant and endothelial cells may also occur. In this way quite large cellular accumulations may separate the lamellæ of the cornea. The central parts of the gummatous nodules may undergo caseation. Other changes include edema of the epithelium and corneal tissues with extension of vessels into the substantia propria from the surrounding vascular structures. The corneal process often resolves to a greater or less extent, but it may disintegrate and form an ulcer or bleb, or produce changes in the curvature of the cornea, or even give rise to staphyloma.

Since Bertarelli produced experimental keratitis by inoculating the corneæ of rabbits with syphilitic products, it has been demonstrated that the corneal lesions contained an abundance of spirochetes. Inoculations in the dog by Hoffmann and Bruning, and in the cat by Levaditi and Yamanouchi, have yielded similar results. More important still, as the result of recent work, it has been shown that spirochetæ pallida are actually present in human corneæ with interstitial inflammation. For instance, Ingersheimer excised a specimen of diseased eye tissue and demonstrated spirochetes in the sections. The wound was covered with conjunctiva and healing occurred.

Antisyphilitic treatment is known to destroy the spirochetæ, to release much endotoxin, to occasion an outburst of cellular degeneration, and to gradually abrogate the Wassermann reaction; hence the slight value to be attached to a negative reaction in a patient who has been treated with mercury, salvarsan, or neosalvarsan.

The treatment for the various ocular manifestations is primarily that for the underlying latent infection.

IS THE PURGATION OF PATIENTS BEFORE OPERATION JUSTIFIABLE?

Under this title ALVAREZ (*Surgery, Gynecology and Obstetrics,* June, 1918) discusses from the clinical and experimental side this topic bearing on daily practice and reaches the following conclusions:

Some of the purgatives owe their effects to the fact that they are irritant poisons that must be removed quickly from the body. Others act by interfering with intestinal

absorption and by upsetting the balance of salts. In either case they bring about pathological conditions. The body is weakened and not strengthened.

We know now that the dehydration of the body and the upset in salt balance are bad, particularly before an operation in which there may be hemorrhage and vomiting.

With magnesium sulphate there may be an increased amount of fluid in the bowel to disturb those who want it empty. In operations on the colon, liquid contents are harder to control mechanically than are solid masses.

There is an increased growth of bacteria. There is some evidence that there is an increased absorption of toxins, and a greater permeability of the mucous membrane to bacteria. Undigested food may be carried down into the colon to supply increased pabulum for the bacteria.

By weakening some parts of the bowel and making others more irritable, the even flow of material from stomach to anus is rendered impossible.

Whether from disturbances in motility, in absorption, in the circulation, or in the bacterial conditions, there certainly is a tendency to flatulence and distention.

When the bowels must move frequently during the night, the loss of sleep is considerable. The purgation is particularly trying if the patient is wearing a large cast, has a broken leg, or other painful lesion which makes each resort to the bedpan an ordeal.

If the patient should happen to have some intestinal obstruction, a gangrenous appendix, a badly diseased Meckel's diverticulum, or adhesions forming around some pus, purgation may directly cause death.

Purgation makes the bowel react so poorly to drugs that there may be grave difficulties in meeting postoperative emergencies.

Emptying the bowel by starvation and purging makes the resumption of colonic activity much more difficult. The colon must be filled and distended to a certain extent before it will empty.

The fact that children and nervous women will sometimes begin vomiting during the night before the operation shows that the purge must be responsible for some of the postoperative nausea and vomiting. The ether adds the finishing touches to what was begun the night before.

It is suggested that food be given as late as possible before operation; that even enemas be avoided if not absolutely necessary; that water and solid food be given by mouth as soon after operation as possible; and that purgatives be avoided after operation as well as before.

THE SOLVENT ACTION OF ANTISEPTICS ON NECROTIC TISSUE.

Taylor and Austin (*Journal of Experimental Medicine*, 1918, xxvii, 155) state that the recent interest in the chemical sterilization of wounds has led to the introduction of numerous new antiseptics, each of which has in turn been advocated because of some advantage, real or apparent. For many of these compounds claims have been made which have not always been confirmed by carefully controlled experiments. Carrel and Dehelly have emphasized that, for the removal of the necrotic tissue that remains after mechanical cleansing, Dakin's hypochlorite solution was the antiseptic of choice because of its solvent action on devitalized tissue, and Dakin and Dunham have also recognized the value of the hypochlorite solution for this purpose.

The authors found from their experiments that Dakin's hypochlorite solution had the power of dissolving necrotic tissue, pus, and plasma clot in the concentration and reaction used clinically. Chloramine-T and dichloramine-T did not exhibit this action.

The solvent action of Dakin's hypochlorite solution of the degree of alkalinity used clinically was due primarily to its hypochlorite content, but its slight alkalinity, while in itself without solvent action, enhanced the effectiveness of the hypochlorite.

In the degree of alkalinity used clinically, the solvent action of hypochlorite was absent below about 0.2-per-cent sodium hypochlorite concentration.

The hypochlorite concentration at which the solvent action ceased was lower the more alkaline the solution, and *vice versa.*

None of the antiseptics studied by the authors had demonstrable solvent action on bloodclot.—*Surgery, Gynecology and Obstetrics,* June, 1918.

FACTORS DETERMINING MORTALITY IN PROSTATECTOMY.

SIMONS (*Interstate Medical Journal,* June, 1918) states that the primary mortality of prostatectomy in the hands of the general surgeon, according to B. A. Thomas, based on the reports of twenty-six representative general hospitals in Pennsylvania and neighboring States, was 22.5 per cent.

Means taken by the specialist to avoid this high mortality are based on the following concepts:

Few, if any, and perhaps no prostatectomies are urgent.

The secondary symptoms of prostatic obstruction should be relieved, if possible, before the patient reaches the operating table. This is really a preparation of the kidney for the sudden (operative) relief of back-pressure, to which it has become more or less accustomed.

The infected bladder should be cleansed as far as possible.

Delay in operation is always advisable in the presence of complications or of fever that cannot be explained, as this may be due to pyogenic infection of the kidney.

The one-stage operation with preparation is preferred in most cases in which the two-stage operation is usually said to be indicated.

The cystotomy should be done under local anesthesia, preferably with a rather high incision.

Speed during the cystotomy is not only unnecessary, but undesirable.

The enucleation of the gland should be done under gas and oxygen; narcosis with ether should be avoided; spinal anesthesia is less dangerous than that with ether.

In enucleation of the gland, both speed and skill are very desirable, and naturally diminish mortality.

In the after-treatment avoidance of the supine position as soon as possible on account of the danger of hypostatic congestion of the lungs and pneumonia in the aged.

Rapid resumption of full diet.

Rapid removal of drainage in order to prevent an indurated suprapubic sinus.

Assumption of drainage through the urethra by the early insertion of a retention urethral catheter.

VACCINE THERAPY IN THE TREATMENT OF ACNE.

DINER (*Urologic and Cutaneous Review,* June, 1918) observes that the administration of the vaccine for therapeutic purposes is very simple. The area, arm or leg, is sterilized by painting with tincture of iodine. A sterile syringe, preferably a tuberculin syringe (all glass) is charged with the vaccine and a suitable dose is injected subcutaneously. After withdrawal of the syringe, the area is massaged with a piece of sterile gauze moistened with pure alcohol.

As a rule, a dose equal to 200 million cocci and, if acne bacilli were isolated and incorporated in the vaccine, two million bacilli is injected as the initial dose. If no local or systemic reaction follows, or if only slight local reddening or an increase of temperature not above 1° F., a second injection consisting of a 50-per-cent increase may be made. If the local or systemic reaction is very marked, then a dose equal to 75 per cent of the first injection is given as the second dose and a gradual increase is made in succeeding doses. As a general rule, each succeeding dose should be increased by an amount equal to 50 per cent of the initial dose until a dose corresponding to five times the initial dose is reached, which is then continued to the end of the injection period.

Should marked local or systemic reactions be encountered during the treatment, then it is advised to return to the next previous dose not showing any reaction and increase the following dose by only one-half the usual addition.

The maximum interval between injections is seven days.

Not less than 10 injections should be given, and in persistent cases treatment should be continued until 20 injections have been given.

Of all the diseases treated by vaccine administration acne stands out as the one most readily responding to that treatment.

The autogenous vaccine is most fruitful of results. Great care should be exercised in obtaining the specimen from the patient and in making the vaccine.

The mode of living of the patient should be made a special point of consideration.

USE OF RADIUM IN NON-MALIGNANT UTERINE HEMORRHAGE.

MILLER (*Southern Medical Journal*, June, 1918) observes that radium treatment in uterine malignancy is rapidly becoming a commonplace, every-day affair.

However, this is not true as regards the various non-malignant conditions causing uterine bleeding. Too often is the patient subjected to the risk, expense, and discomfort of a hysterectomy, when the application of radium for fifteen or twenty hours would accomplish the same result as the major operation. Of course, a careful selection of the cases is essential, as it would be manifestly absurd to employ radium in adnexal diseases or tumors, degenerating fibroids, large polypi, incomplete abortion, ectopic gestation, etc.

The non-malignant conditions of the uterus causing menorrhagia or metrorrhagia may be grouped as follows:

1. Cases in which there is little or no demonstrable pathologic change in the uterine wall, no history of infection, and in which the uterus is apparently normal in size and position, with normal adnexa. In such cases the bleeding is in all probability due to some disturbance of the internal secretions, especially of the thyroid or of the ovary. This condition is often encountered in young girls about puberty.

2. The menopause.

3. Chronic metritis (or rather the increase of fibrous tissue in the uterine wall subsequent to chronic metritis).

4. Hypertrophy or hyperplasia of the endometrium, especially when so marked as to be adenomatous or polypoid in character.

5. Fibroids, adenomata, or adenomyomata of the uterus.

6. Chronic endometritis, especially after incomplete abortion.

7. Passive congestion of the uterus, as in retroflexion or prolapse.

In the first three groups radium may be used to the exclusion of surgery; in groups four and five, some cases are suitable for radium and others require operation; while in groups six and seven operation is indicated.

CLARK (*Surgery, Gynecology and Obstetrics*, June, 1918) states that as a palliative remedy, radium is the treatment *par excellence* in inoperable cases of cancer of the cervix.

In border-line cases in which formerly we accepted the grave risks of an operation in the hope of eradicating the disease, we now employ radium, but in the certainly operable class we still advocate a radical operation.

In cancer of the fundus, even when far advanced, we perform a hysterectomy, resorting to radiotherapy only in the face of grave operative contraindications.

As yet Clark claims no cures, but, based upon the observation of a considerable number of inoperable cases which have remained locally healed from one to three years, he ventures to hope that the quinquennial test will find several survivors.

In this brief summary the author has attempted to give a fair and unbiased statement of the benefits, limitations, and dangers of radiotherapy in gynecology. His conclusion of to-day may be considerably changed by our experience of to-morrow, for this therapeutic endeavor is still in the period of probation, but experience thus far has proven with great assurance that the benefits of radiation are so great that no well-ordered clinic can do the best work without it. In the author's experience 100 milligrammes have been sufficient to serve a most satisfactory purpose in gynecologic practice.